In this book, you will find;
- Past CGCE Questions, Paper I [JUNE 2013-2021]
- Past CGCE Questions, Paper II [JUNE 2010-2021]
- Modelled answers to Paper I & II

Decipher it!

THE ULTIMATE GUIDE TO GRASPING AN 'A' IN A-LEVEL ICT, CGCE.

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DECIPHER IT!

THE ULTIMATE GUIDE TO GRASPING AN 'A grade' IN A-LEVEL ICT, CGCE.

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By Nkweauseh Reginald Longfor
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DEDICATION

In loving memory of ***Lonpa Tatepong Alix Melaine****. You left fingerprints of grace on our lives, you shan't be forgotten…*

ACKNOWLEDGEMENT

The accomplishment of this work was not a day’s job but its eventual completion was made possible by numerous individuals and above all THE divine grace. My eternal gratitude goes to the almighty God, who gave me the required inspiration and the spirit of determination and focus to realize this work.

My greatest thanks and deepest appreciation go to the following people whose contributions have either been technical, financial, moral or otherwise:

Lobisi Paul Longfor (My father), Cecilia Kuoh Tufon Espe Lobisi (My mother), Tatepong Francois (Ph.D), Mrs Bih Sylvian Tufon(sister), Nyoh Clovis Tioveh(brother), Tewagnoh Harrignton(brother), Nkeumtoh Carelle(sister), Nziembi Laura Longfor(sister), Mr Piankeh Albert, Mr Emmanuel Mbemoun, Mr. Ngwa Andrew, Ms. Afonfembi Salome Abety, Mr Ndifor Hyacinth, Mr Tangong Nelson, Ms. Lonlac Magolac Vanessa, Mr. Chi Emmanuel, Mr. Songsang Thomas Roger, Mr. Nkinyam Eugene, Mr Tchuenkam Ulrich, Ms Kealack Ngandjou Dorval, Mr Fotso Fokan Evrard.

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FOREWORD

This book presents the central role that revision plays in a student's preparation for examinations. It illustrates how question interpretation and analysis are drivers to a greater performance during an examination. The student may master his lectures, understand every aspect of the subject, but a wrong understanding of the aim and scope of the questions could put his success in jeopardy.

This book primarily targets educators, who play a very important role in the growth and development of youths. Instructor influence during facilitation, lack of motivation, lack of concentration, inadequate resources are very important factors that account for grade inflation (low grades) during examinations. Therefore, there is a need to prepare for examinations by a total consolidation of all resources (questions and modelled answers) available, especially those which could help reinforce the know-how of students in the subject matter and in turn prepare them for the onslaught of work against examination evaluations.

The book – Decipher It! Aims at, helping students in getting the resources (questions) necessary for examinations, giving students a foretaste of what the examination evaluation in ICT - CGCE is all about, enabling students have some additional skills and techniques in interpreting and answering questions during examinations, making students identify some common trends in examinations for the past years, and helping them better prepare through revising lectures with some supplementary notes added at the end of some of the questions.

Grateful acknowledgment is here made to the author who amassed data for this impressive work. The book would not have reached its present form without his invaluable efforts.

Ngwa Andrew Mberewi

Coordinating Inspector, Computer Science,

West Region, Cameroon

ORGANISATION OF THE TEXT

This book is organized into sections(two); One Section for questions (Paper and paper II) and another section for Modelled answers to the questions. The sections take you through the process of mastering the Fundamental concepts in ICT.

This text primarily aims at enabling students to have an idea of what the CGCE examination is all about and eventually learning via self-evaluation. In this case, the student could read his notes and then test himself by himself using this book.

Decipher It! can help reinforce and extend what was studied in class during lectures, thus, students are encouraged to attend lectures and use this book as a handbook for preparations for upcoming examinations. The modelled answers to each question type (Paper I and II) have as objectives;

- Guide students on how to interpret and approach questions during examinations.

- Provide students with an extensive knowledge on the topic(s) which features recurrently in the examinations for the past sessions.

- Reinforce students’ knowledge acquired during lectures.

Students are encouraged to always criticize the approaches and methodologies used for answering questions/calculations before adopting them, else the book may not serve its purpose.

SECTION I-A: Multiple Choice Questions (MCQs), PAPER I

CGCEB JUNE 2013

1. Software that allows a team to have an electronic "face-to face" meetings when members are geographically dispersed is
A. E-mail software
B. Chat room software
C. E-messaging software
D . Videoconferencing software

2. Which of the following is a transaction processing system?
A. Robot that sells in a supermarket
B. Point of sale system
C. Distributed computing system
D. Medical diagnostic system

3. Copyright laws
A. Prevent and punish people who duplicate open source software
B. Compensate authors for an intellectual art
C. Protect authors of their intellectual property
D. Defines principles in the field of authorship

4. Which of the following best describes the action of a hacker?
A. unauthorized deletion of data
B. unauthorized modification of data
C. unauthorized access to data
D. unauthorized copying of data

5. Which one of the following is least likely to happen if a virus is introduced into a computer?
A. The data will be severely damaged
B. Hardware will be damaged
C. The system may run slowly
D. The memory may get chocked up

6. The software that is used to locate websites on the Internet using keywords in files and documents is called
A. Internet browser
B. Search engine
C. Spyware
D. Uniform resource locator (URL)

7. Data as defined in Data Protection Act refers to
A. All unprocessed facts
B. Information about individuals who are still living
C. Information about living or dead people
D. Data that has been input in the computer

8. Which of the following is performed by an application software?
A. Scheduling of computer processes
B. Memory management
C. Information system management
D. Providing user interface

9. Which of the following statements is true about software packages?
A. The user interface and menu structures are alike
B. A file in one program can be opened through the others
C. The programs constituting the package are grouped in the start menu
D. The files of the programs constituting the package have the same extension

10. Which of the following has the same functions as the RAM?
A. Flash memory B. Read only memory
C. Cache memory D. Virtual memory

11. The mode of exchange of information between components of the computer one bit at a time over a single channel is called
A. Parallel B. Synchronous
C. Asynchronous D. High speed

12. Which wireless standard would you use to design a wireless computer network within a radius of 100 metres?
A. Wifi B. Infrared
C. Bluetooth D. Fibre-optic

13. The fifth generation of computers combine
A. Vacuum tubes and semi-conductors
B. Transistors and punch cards
C. Large scale integrated circuits
D. Large scale integrated circuits and artificial intelligence

14. "Process data in time to affect the next input" is best described by the term
A. Real-time processing B. Spooling
C. Batch processing D. Queuing

15. Which of the following is a type of operating system?
A. Multi-user B. Multi-duplex
C. Win 32 D. Multi-time

16. Which of the following people are responsible for preparing users to accept a new information system even before it is in place
A. System analysts B. Programmers
C. Trainers D. Database administrators

17. The ability for software to translate voice into text is known
A. Speech recording B. Speech recognition
C. Speech translation D. Speech digitization

18. Which of the following scanners can be used to capture and convert hand-written text into editable text?
A. OMR B. MICR
C. OCR D. Barcode reader

19. Which of the following can serve as an organization's standard for input control?
A. Two persons input the same data and the software compares
B. Getting an experienced data entry operator
C. Using validity check software
D. Avoiding noisy environments

20. The system that stores data to process after a period of time is known as
A. Periodic processing
B. Stream-line processing
C. On-line transaction processing
D. Batch processing

21. 1 picosecond is equivalent to
A. 1.0 x10^{-10} seconds B. 1.0 x 10^{-6} seconds
C. 1.0 x 10^{-9} seconds D. 1.0 x 10^{-12} seconds

22. The approach in which a new system is built by evaluating a model of the system is called
A. Simulation B. Prototyping
C. Imitation D. Modelling

23. Which of the following can be referred to as the computer's main internal backing storage device?
A. CD-ROM B. ROM
C. Floppy disk D. Hard disk

24. Which of the following types of languages is not a high-level programming language?
A. imperative B. declarative
C. object-oriented D. assembly

25. In designing a new system, it is important to diagrammatically represent the organization's departments, users, programs and data that will play a role in the system. This diagram is called?
A. Data flow diagram
B. Structural analysis diagram
C. Entity-relationship diagram
D. Design tools diagram

26. The rule that helps to ensure the quality of information in a database is
A. Party check B. Entity Relationship
C. Primary key D. Data integrity

27. The data manipulation subsystem of DBMS consists of
A. Database forms B. Report generators
C. Query by examples D. All of the above

28. The word "attributes" in a database are properties of
A. A database B. A field
C. A record D. An entity

29. The field in a database that uniquely identifies a record in a table is
A. Secondary key B. Foreign key
C. Primary key D. Unique key

30. One main property of a 4GL that a 3GL does not have is
A. procedural B. Non procedural
C. Machine independent D. Machine dependent

31. Which of the following are parts of the CPU?
A. Arithmetic logic unit and control unit
B. Arithmetic logic unit and RAM
C. Control Unit and RAM
D. Hard disk and execution unit

32. The register in the CPU that keeps track of the address of the memory location of the next instruction is called
A. Memory address register
B. Program counter
C. Instruction register

D. Memory data register

33. Which type of storage medium is a hard disk?
A. optical B. Magnetic
C. Solid state D. Radio

34. The utility that rewrites all the parts of a file into contiguous clusters of a hard disk is called
A. Scandisk B. Antivirus
C. File manager D. Defragmentation

35. For the website www.gceb.cm, the top-level domain is
A. www. B. .gceb.cm
C. .cm D. www.gceb

36. To view a web page we use a
A. Web processing application B. Browser software C. Web authoring D. System software

37. Which of the following tasks is carried out by the operating system?
A. Data capture
B. Providing help to application software
C. Transferring data to a printer
D. Compiling programs

38. Which of the following software enables the computer to understand human programming language?
A. Processor B. Compiler
C. Editor D. Database

39. Which of the following is an activity in the design stage of the development of a system?
A. Checking that the system gives the required output B. Plunge
C. Interviewing future users about their requirements
D. Creating the data and file structure.

40. Systems can fail for a number of reasons. Which of these is the most likely reason for system failure?
A. Power failure
B. Data entry error
C. Poor system design by the system analyst
D. Poor installation work by technical staff

41. The conversion method in which you target only a portion of a new system is called
A. serial B. Pilot
C. Parallel D. piecemeal

42. A dataflow diagram shows
A. How computers are connected in a network
B. The way organizational data and information are handled
C. What software will be used to process data
D. The parts of a system that processes specific data

43. Which of the following data structures supports LIFO?
A. queues B. stacks
C. arrays D. Harsh tables

44. A computer system that provides periodic and predetermined reports that summarize information to facilitate decision-making is?
A. Periodic information system
B. Geographic information system
C. Transaction processing system
D. Management information system

45. A graphical representation of an algorithm is known as
A. pseudocode B. Flow chart
C. control flow chart D. Gantt chart

46. It is a strategy or process to get rid of errors in a system
A. Prototyping B. Testing
C. Debugging D. Validating

47. A set of instructions written in a programming language is known as
A. Pseudocode B. Source code
C. Algorithm D. Data flow chart

48. The software that you will use to create a three-dimensional computer simulation in which you can actively and physically participate
A. VRML B. HTML
C. XML D. WML

49. Which of the following systems is knowledge-based?
A. Expert system B. Artificial intelligence
C. Natural network system D. Information system

50. Which of the following is correct in Boolean logic?
A. 0 AND 1 = 1 B. I AND 0 = 1

C. 0 OR I = I D. 1 OR 0 = 0

CGCEB JUNE 2014

1. The Internet can be defined as:
A. Network of computer networks that share resources.
B. Interconnection of computers that share resources across regions.
C. Worldwide network of computers that share resources.
D. World Wide Web.

2. Which of the following is true about multitasking operating systems?
A. Several CPUs are needed to process a task at a time.
B. A CPU can process several tasks at a time.
C. Several users can access the same task at a time.
D. Several CPUs with each processing a separate task.

3. The performance of a network does NOT depend on the:
A. Number of users.
B. Capabilities of the connected hardware.
C. Bandwidth.
D. Distance between connecting devices.

4. The basic device that acts as a central controller to all the computers on a school network is called:
A. Modem. B. Switch.
C. Server. D. RJ45 connector.

5. The number of separate cables needed in a mesh topology of FIVE computers is:
A. 10 B. 5
C. 4 D. 8

6. Which of the following cables is the fastest channel of communication in computer networks?
A. Fibre optic.
B. Coaxial cable
C. Unshielded twisted pair.
D. Shielded twisted pair.

7. The correct spreadsheet formula for the average of two cells Al and A2 where Al is possibly blank is:
A. =(A 1:A2)/2
B. =average(Al+A2)
C. =AVERAGE((Al+A2)/2)
D. =average(A1,A2)

8. Which of the following is NOT possible in a word processing software?
A. Add values in a table.
B. Merge cells in a table.
C. Wrap text in a table.
D. Link cells in different tables.

9. The application software that is best used to project reports to an audience using a digital projector is:
A. Word-processing software.
B. Scanner software.
C. Presentation software.
D. Spreadsheet software.

10. Which of the following is AGAINST copyright laws for acquired software?
A. Making a backup copy of the software.
B. Installing the software in unlimited number of computers.
C. Using the software in a country different to that in which it was bought.
D. Using the software for unlimited period of time.

11. A method to reduce piracy of software supplied on CDs is:
A. Use of serial numbers.
B. Write protect CDs.
C. Production of tutorials.
D. Identifying end user.

12. The collection of principles that judge whether people's actions are correct or wrong is known as:
A. Legislation. B. Data Protection Act.
C. Ergonomics. D. Ethics.

13. A UPS is a device that CANNOT be used to:
A. Provide power to a computer when electricity supply fails.
B. Stop excess flow of electricity into a computer.
C. Stabilizes electricity flow into a computer.
D. Automatically stop electricity flow into a computer.

14. A tool that can recognize and execute a sequence of instructions written in a programming language is:

A. Compiler.	B. Translator.
C. Assembler.	D. Interpreter.

15. In writing codes in a programming language, one must follow the rules of the language called:

A. Coding.	B. Protocol.
C. Syntax.	D. Semantics.

16. An error in a program code is also known as a(n):

A. Syntax.	B. Interrupt.
C. Codec.	D. Bug.

17. At which of the following stages will the programmer concentrate on devising a test plan?

A. Requirement analysis.

B. Procedural implementation.

C. Design.

D. Investigation.

18. How many CDs of 700 MB capacity can contain 100 newsletters from a digital library assuming that the average number of characters of each newsletter is 1000?

A. 10 B. 11 C. 1 D. 70

19. A functional requirements report indicates the work done in the ……………. phase.

A. Development	B. Investigation
C. Design	D. Analysis

20. The bit pattern of the digit 0 in ASCII code is 00110000. What would be the bit pattern for the digit 2 assuming that the representation of adjacent digits corresponds to adjacent binary numbers?

A. 00111000	B. 00110100
C. 00110001	D. 00110010

21. Which of the following is a recommended practice in writing good algorithms?

A. It must be written in English.

B. It must not be too long; at most 20 lines.

C. Keywords must be written in capital letters.

D. It must have finite number of steps.

22. One characteristic of algorithms is that:

A. They can easily be executed by the computer. B. They can easily be executed by a compiler.

C. They can run on most computers.

D. Non-programmers can understand it.

23. In low level programming languages,

A. Codes are written in a form that the computer can execute directly.

B. Programmers easily write codes using them.

C. Programs are cheaper to design.

D. Codes cannot be used to write programs for difficult tasks.

24. One advantage of high level programming languages over low level programming languages is:

A. It is written in a language easily understood by programmers.

B. It is cheaper to get associated software.

C. Its Software is more common in the software market.

D. It's less bulky in relation to memory space.

25. In Object Oriented Programming, programmers are able to:

A. Program objects that serve human beings.

B. Create relationships between objects.

C. Describe behavior of objects in terms of their characteristics.

D. Represent program codes as objects.

26. The machine cycle includes Fetch, Decode, ………., and Store.

A. Execute	B. Coding
C. Process	D. Run

27. Sequential files may be accessed by a:

A. Key field.	B. Loop.
C. Memory registers.	D. Pointer.

28. In relation to database, a file is defined as a collection of:

A. Similar items.	B. Related records.
C. Related fields.	D. Tables.

29. A file organization (and relevant access method) is most dependent on the:

A. Ordering of records in the file.

B. Layout of the records in the file.

C. Characteristics of the storage medium.

D. Components of records in the file.

30. One advantage of hashed organization of files is that it:

A. Is faster to access files by considering their frequency of usage.
B. Permits direct access of records that are placed randomly.
C. Discourages file defragmentation for easy access.
D. Compresses records and thus uses less storage.

31. A flat file database is different from a relational database in that:
A. Its tables have more fields.
B. It is made up of one table.
C. It eliminates redundancy.
D. It contains a unique primary key.

32. One possible way to create a table using a DBMS is in:
A. Design view.
B. Datasheet view.
C. Table view.
D. Query view.

33. Which of the following database objects is used to enter data into a relation?
A. Queries
B. Reports
C. Forms
D. Relationships

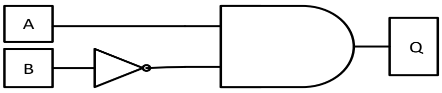
34. An information system that does NOT directly assist in the management of an organization is:
A. Management Information System.
B. Geographic Information System.
C. Health Information System.
D. Decision Support System.

35. A field that can be used to sort data in a table is called a(n):
A. Primary key.
B. Foreign key.
C. Secondary key.
D. Identity key.

36. Which of the following is true about database tables?
A The number of tables in a database must be less than six.
B The number of fields must exceed two.
C The order of the fields is not important.
D The primary key must be the first field.

37. Consider the following logic Arithmetic for AND gate, where:
A. = 0 AND 0; B. = 1 AND 0; C. = 1 AND 1 The truth values A, B and 9 is:
A. A=0, B=1, C=1
B. A=1, B=0, C=0
C. A=0, B=0, C=1
D. A=0, B=1, C=0

38. The output Q in the circuit below is equal to:



A. $\overline{A.B}$
B. $\bar{A}$ + B
C. $\bar{B}$. A
D. $\bar{B}$ + A

39. Which of the following is an activity of system implementation?
A. Decide on which hardware to use.
B. Writing algorithms.
C. Training of users.
D. Describing output formats.

40. Which of the following defines pilot implementation of a system in an organization?
A. Abandon the old system and switch to the new one.
B. Use the old system alongside the new one.
C. Use the new system only in a department; then later extend to others.
D. Use just part of the system processes; then later use the new.

41. One detail found in the user's guide of a system is:
A. Users' job description.
B. Upgrade possibilities.
C. Algorithms.
D. Codes of various tasks.

42. The number 4683 is not a possible number in octal because it:
A. Neither contains binary digits.
B. Contains only four digits.
C. Contains the digit 8.
D. Is not divisible by 8.

43. One way to avoid repetitive stress injury is to:
A. Use LCD monitors.
B. Avoid eye contact with the monitor.
C. Use level tables.
D. Use adjustable chair.

44. Different programmers can write program modules in different platforms using high-level non procedural languages. Which generation of

programming languages could be most easily used to integrate their different modules?

A. First B. Second
C. Third D. Fourth

45. Which of the following determines whether a project should be carried out?
A. Identification.
B. Feasibility assessment.
C. Program specification.
D. System evaluation.

46. In the analysis phase, the development of which of the following clearly states the goals and objectives of the project.
A. Flowchart
B. Program specification
C. Design
D. Documentation

47. What would be the main advantage of using a prototype in the design phase of an information system? It …………………………..
A. Provides enough evidence of functionality.
B. Is the final design of the information system.
C. Helps automate the task of documentation.
D. Helps to train the users before conversion.

48. The organized process or set of steps that needs to be followed to build an ICT system is known as:
A Information System Analysis.
B. Project Management.
C. System development life cycle.
D. Software development life cycle.

49. A manager who needs a type of information, system that would enable the importation of very reliable and recent data from a database should acquire:
A. A management information system.
B. Real time processing system.
C. An executive information system.
D. A transaction processing system.

50. After a system has been successfully designed, the end users must evaluate to see that it meets their needs and functions correctly. This type of testing is …………….
A. Unit testing B. Program testing
C. Acceptance testing D. Module testing

CGCEB JUNE 2015

1. The computer that allows more than one user to work at the same time is known as a
A. mainframe computer
B. embedded computer
C. microcomputer
D. multi-programmed computer

2. ……………… is the technological basis on which the Third Generation computers were built.
A. Transistor B. vacuum tube
C. Microprocessor D. integrated circuit

3. A computer that exists in a system that cannot be reprogrammed by the user is
A. Tablet computer system
B. Embedded system
C. Handheld computer system
D. System access control

4. The De Morgan law for the logic AND states that $\overline{A.B}$ =
A. $\overline{A + B}$ B. A + $\overline{B}$
C. $\bar{A}$+ B D. $\bar{A}$+ $\bar{B}$

5. Which of the following is NOT a function of an operating system?
A. Providing user interface
B. Memory management
C. Executing program instructions
D. System access control

6. A chip in computer that contains essential information in a computer such as the date and time is
A. CMOS B. BIOS
C. RAM D. ROM

7. What file format would you use for publishing and distributing electronic text documents?
A. .mpeg B. .jpeg
C. .pdf D. .wav

8. A document created in an application package which could be used over and over by many users for the same purposes is known as:
A. Wizard B. Template
C. Draft D. Form

9. The check by computers to ensure that data entered into a database is sensible is known as:
A. integrity check B. Verification
C. Validation D. redundancy check

10. Which of the following application packages would be the most appropriate for representing information on charts and performing calculations?
A. Presentation Packages
B. Database Packages
C. Word processing packages
D. Spreadsheet packages

11. Which of the following is an advantage of a Vector-based graphics format?
A. It allows graphs to be placed in a vector form
B. It is device independent
C. It allows vectors to be used to draw graphs
D. It tolerates straight line graphs

12. The act of gaining unauthorized access by use of network to people's computer is known as
A. Hacking B. surfing
C. Scamming D. spoofing

13. Software designed to meet the needs of a particular organization is called
A. Generic B. Surfing
C. Integrated D. Bespoke

14. One way to limit piracy of intellectual property is by
A. Use of antivirus software B. using encryption
C. enforcing legislation D. use of firewall

15. An information system that provide periodic and predetermined reports that summarizes information only is called
A. MIS B. GIS C. HIS D. DDS

16. An information system consists of
A. Software and hardware
B. People, software and hardware
C. People, data, machine and procedures
D. People, data, software and procedures

17. An expert system that is used in organization to manage daily business activities can also be termed as a
A. GIS B. DSS C. MIS D. TPS

18. A linear list whose elements are inserted and deleted in a last-in-first-out order is a
A. Stack B. Queue
C. Hash table D. Binary tree

19. Which of the following is in the right order of time measurement?
A. Picoseconds-nanoseconds-microseconds
B. Nanoseconds-picoseconds-microseconds
C. Microseconds-nanoseconds-picoseconds
D. Microseconds-nanoseconds-picoseconds

20. Which of the following is NOT true about arrays?
A. Access elements by an index
B. Sort the elements
C. Can hold element of same type
D. Can hold elements of different types

21. How many KB (as used in everyday speaking) are in 1.5 GB?
A. 1500 B. 15000
C. 150000 D. 1500000

22. The technique of developing a system model and testing to make adjustments until an acceptable product is realized is known as
A. Try-by-error B. Flow charting
C. Waterfall model D. Prototyping

23. Some programming languages are said to be high level because
A. Codes are written in a form that the computer can easily execute
B. Programmers easily write codes using them
C. They are cheaper to design
D. They cannot be used to write programs for difficult tasks

24. A module in a system is said to be reusable if the module is
A. Independent of the system
B. Depends only on a few modules in the system
C. Iteratively defined

D. Recursive

25. A data communication method in which bits are transmitted through separate channels simultaneously is termed
A. Parallel data transmission
B. Serial data transmission
C. Simplex data transmission
D. Asynchronous transmission

26. Devices in a network indicate their connectivity during data transmission by
A. Buffering B. Handshaking
C. Signaling D. interrupts

27. Which is a data transmission method by which signals from several lines are made to be transmitted through a single line?
A. Serial Transmission B. Broadband Transmission
C. Switching D. Multiplexing

28. The main role of a repeater in a network is
A. Separates a single stream of signals into separate streams
B. Selects the best path for network packets
C. Boosts the strength of signals to cover long distances
D. Receive sends signals only to requesting computers in a network

29. Controls the flow of each character in asynchronous transmission mode.
A. Error control bits B. Start-stop bits
C. Parity bits D. Check-sum bits

30. The cheapest means by which a group of students found in different geographic locations can exchange views through the Internet is by
A. E-mail B. Forum
C. Videoconference D. Skype

31. The topology with the greatest fault tolerance is
A. Mesh B. LAN C. Ring D. Bus

32. A device that connects computers and forwards data packets from one network segment to the other of different platforms is a
A. Hub B. Bridge
C. Switch D. Router

31 The bandwidth of Internet connection in a public cyber café suddenly becomes congested. One possible reason is
A. Poor weather B. Number of users
C. Virus. activity D. Poor network design

34. If a laptop is to have Internet connection through a LAN with Internet facilities then
A The laptop needs an IP address
B The user must be given a password
C The service provider must be contacted
D The modem must be used to connect the laptop to the LAN.

35. The protocol used to receive electronic mail over the Internet is
A. TCP/IP B. SMTP
C. FTP D. VOIP

36. The buying and selling of stocks over the Internet is called
A. E-commerce B. E-shopping
C. E-banking D. E-trading

37. Which is the correct order of the stages of the SDLC?
A. Analysis, implementation, design, maintenance
B. Design, analysis, support, implementation
C. Analysis, design, implementation, support
D. Coding, support, evaluation, maintenance

38. The phase in a system development life cycle where requirements are first identified is
A. Feasibility studies phase B. analysis phase
C. Implementation phase D. design phase.

39. A practice that enhances understanding of algorithms is
A. Use of capital letters
B. Use of good language
C. Use of programming words
D. Use of comments

40. Algorithms are different from codes in that
A. They can be easily executed by the computer
B. They are easily understood by non-programmers
C. They are shorter than codes.
D. They have a style of presentation

41. Which of the following control structures is NOT a loop structure?

A. IF-THEN statement B. REPEAT statement
C. WHILE statement D. FOR statement

42.

```
Start
Get an integer, x
Get another integer, y
If x < y then
      Take y to be y-2
Else
      Take x to be y*2
EndIf
Print x, y
Stop.
```

If x=3 and y=7 then the output is
A 14, 5 B 14,1 C 3, 5 D 3, 7

43. An example of an Object Oriented programming language is
A. Turbo Pascal B. C#
C. Java D. Fortran

44. In programming, what specifies the order in which a computer will execute each line of software code?
A. Switch Statement B. Control Structure
C. Conditional Statement D. Syntax structure

45. Which of the following is true about Functional programming?
A. It is used to calculate using mathematical functions
B. It focuses on what has to be done rather than on how it is done
C. It is used in programming functions
D. Its codes are made up of mostly functions

46. The structured approach of writing programs using routines is beneficial in that
A. It makes programs to be easily understood by non-programmers
B. Routines can be tested in isolation before being added to larger programs
C. It generates output after each statement for easy understanding
D. Programs can run even when there are errors

47. Which of the following may not be helpful to a project manager in the execution of a project?
A. PERT chart B. Scheduling software
C. Data flow diagrams D. Gantt chart

48. Some tasks can be extended for a number of days without affecting the finished day of a project. Such a task is known as
A. Slack task B. Floating task
C. Critical task D. Extended task

49. In html, the tags <ol> are used to create
A. Ordered list B. Bulleted list
C. Lines of text D. Indentation

50. To avoid unnecessary duplication of the same data in a database
A. We have to normalize the database
B. We have to query the report generator
C. Avoid using tables with so many fields
D. Proof read any data before input into the database

CGCEB JUNE 2016

1. The two activities of the machine cycle that take place in the control unit are
A. Decode-execute B. Fetch-decode
C. Decode-store D. Execute- store

2. The memory location with the fastest access rate is
A. ROM B. RAM
C. Register D. Cache

3. The resolution of the print out of a printer is measured in
A. Pages per minute B. Dots per inch
C. Pixels density D. Dot pitch

4. Which of the following provides a mechanism that can be used to convert scanned text into editable text?
A. OCR B. MICR
C. OMR D. Digitizer

5. A document that states in writing how a company plans to protect its physical and data assets.
A. Data protection act B. Copyright
C. Data dictionary D. Security policy

6. What type of backup should be performed prior to an upgrade?
A. Differential B. Sequential
C. Procedure D. Full

7. Which of the following is NOT a function of the operating system?
A. Deciding which instructions stay in the RAM.
B. Program interaction
C. Decode instructions in a computer.
D. Making hardware ready for application use.

8.The integrity of data can be assured by
A. Creating several backups of the same data
B. Data verification
C. Proper antivirus protection
D. Use of passwords

9. Which of the following can be used to describe the term spooling
A. A queue of data in a computer for printing
B. Input information into the printer online
C. Simultaneous processing and storage online
D. Direct conversion of speech into print

10. A term used to describe the process of discovering patterns in data that can lead to predictions about the future.
A. Data mining B. Verification
C. Normalization D. Data processing

11. The software that enables the operating system to recognize a newly connected device is known as
A. Utility software B. A driver
C. An interpreter D. A device manager

12. Third generation digital electronic computers use …………… for the design of its electronic circuits.
A. Transistors B. Logic gates
C. Vacuum tubes D. Integrated circuits

13. Which of the following is NOT a system software?
A. File manager
B. Anti-virus software
C. Productivity software
D. File compression software

14. A transaction processing system is concerned with
A. The operational day-to-day activities.
B. The strategic decision-making support.
C. A large database of specialized knowledge.
D. Daily update of database

15. A finance system that predicts future business situation is an example of a
A. Predictive system
B. Executive support system
C. Knowledge based system
D. Management information system

16. A method of processing that cumulates data to process it after a period of time is called …………………. processing.
A. Batch B. Online
C. Distributed D. Periodic

17. Which of the following is not a benefit of ICT in business today?
A. Accurate results
B. Size of business
C. Instant response

D. Speed of processing

18. The word size of a computer processor refers to the
A. Number of instructions processed at a time
B. Number of bits the CPU can process simultaneously
C. Number of characters it can allow in the database field
D. Maximum number of words that can stay in the RAM for processing

19. A protocol which enable the functioning of global network of computers is
A. FTP B. Internet Protocol
C. HTTP D. TCP/IP

20. A company writes a computer program to carry out a specific job. This type of program is called;
A. Custom software
B. Off-the-shelf software
C. General-purpose software
D. Special-purpose software

21. A spreadsheet formula is given as =SUM(A1:D2). Two cell addresses involve in the formula are
A. B2 and Cl B. A3 and B2
C. A2 and B3 D. B3 and D1

22. A system of programs and data structures that approximates the operation of the human brain is
A. Embedded system
B. Modelling and simulation
C. Genetic programming
D. Artificial intelligence

23. Which of the following memories is found in the CPU?
A. RAM B. BIOS
C. ROM D. Register

24. What is true about mobile networks is that they
A. Cannot be intercepted.
B. Are not accessible everywhere.
C. Are available only on mobile phones.
D. Cannot be intercepted by walls.

25. A huge collection of electronic pages containing information about many different subjects is called
A. Google B. Facebook
C. World wide web D. Search engine

26. Uploading or downloading data to or from a remote computer on the Internet is done by
A. FTP B. SMTP
C. POP D. TCP/IP

27. Teleworking is getting normal office work done by working
A. From a telephone company.
B. Away from the office.
C. Online out of the office.
D. On the Internet while in the office.

28. At which stage of a SDLC do we check and modify the system to ensure that it continues to meet changing business need?
A. System investigation
B. System design
C. System analysis
D. System maintenance and review

29. Which of the following is an activity in the implementation phase of a new system?
A. Determining test items
B. Training of users
C. Writing algorithms
D. Writing codes

30. The order of execution of instructions in high level programming language is determined by
A. Sequence B. Syntax
C. Semantics D. Control structure

31. The method used by organization to completely do away with the old system to use a new system is known as ………………… implementation.
A. Direct B. Parallel
C. Phased D. Complete

32. Software that can convert codes written by programmers in high level languages into machine code is
A. Compiler B. Assembler
C. Decoder D. Operating system

33. A milestone in project management indicates the
A. Completion of the first stage of the project
B. Passing of 50% of the time allocated to the project.

C. Completion of an important stage of a project.
D. Conclusion of a stage of a project with a zero-time lag.

34. When a program fails to compile because a statement separator such as a semicolon is missing in the program, this type of error is known as a
A. Lexical error. B. Syntax error.
C. Logic error. D. Semantic error.

35. A program that provides a way to look at and interact with the information on the World Wide Web is a
A. HTML editor B. Search engine.
C. Browser. D. Web crawler.

36. A field in a database table which appears as a primary key in another database table is called a
A. Candidate key. B. Secondary key.
C. Foreign key. D. Primary key.

37. The process of determining whether someone is, in fact, who he/she is declared to be is
A. Authentication. B. Identification.
C. Confidentiality. D. Privacy.

38 The type of software that reduces file size in storage without affecting the content of the file is
A. Trojan B. Defragmenter.
C. Driver software. D. Utility software.

39. Which of the following is a data security measure that can be used to prevent external threat in a network?
A. Use of firewall. B. Defragmenter
C. Biometric Systems. D. Debugging software.

40. Which of the following statements is NOT true - about a primary key?
A. It does not contain a blank value.
B. It is a unique identifier of records.
C. It is always in text form.
D. It should be the first field in a table.

41. Concerning e-banking, what is the advantage of ATM to a banker?
A. To withdraw money at any time.
B. Serve many people at a time.
C. Control the amount of money paid to customers.

D. To save customers time

42 To do research, buy and sell stocks online is known as:
A. E-banking B. E-marketing
C. E-commerce D. E-trading

43. A programmer who requires solving a problem that make logical decision based on a condition use………. Control structure
A. Sequence B. Selection
C. Repetitive D. Iterative

44. A study method in which the user receives study material and takes examination online is known as:
A. Electronic mailing.
B. Computer aided learning.
C. Videoconferencing.
D. Electronic learning.

45. A graphical representation of an algorithm is known as
A. Pseudo code B. Logic structure
C. Flow chart D. Flow diagram

46 The paradigm in which the programmer designs programs by outlining steps to be followed to solve a problem is called:
A. Top-down programming
B. Procedural programming
C. Stepwise programming
D. object-oriented programming

47. At which stage of project management is it possible for a decision to be taken to cancel the project?
A. Initiation. B. Planning.
C. Implementation. D. Termination.

48. Which of the following is not a project management constraint?
A. Critical path. B. Time.
C. Cost. D. Scope.

49. Which communications technique transmits many signals simultaneously over a single channel?
A. Duplexing B. Half duplexing
C. Channeling D. Multiplexing

50. What is the output of the algorithm below?

```
1. Set i to 1
```

```
2. Set total to 1
3. Do steps 4 and 5 until i > 3
4. total = total* i
5. i = i+1.
6. Output: total
```

A. 24 B. 20 C. 3 D. 15

CGCEB JUNE 2017

1. A system that is used in decentralized marketing system which can make report on items that are highly demanded and indicates which ware house can furnish specific items is an example of
A. Management information system.
B. Electronic sale system.
C. Stock control system.
D. Point of sale system.

2. A system that predicts future weather condition is
A. GPS
B. Geographic information system.
C. Decision support system.
D. Expert system.

3. An application software used by engineers to design complex structures is
A. CAM B. CAD
C. CAL D. MIS

4. Which of the following is prohibited by the Data Protection Act?
A. Access to personal data
B. Exposure of personal data in the Internet
C. Reading information about others in the Internet
D. Distribution of copyrighted material for free

5. Which of the following is a computer crime?
A. Downloading videos from the Internet into computer
B. Sending threats to people through the Internet
C. Watching pornographic images at home
D. Uploading personal data into the Internet

6. Which of the following statements DOES NOT describe a good approach to information security for an organization?
A. Passwords are changed regularly
B. Regular back up of computer systems
C. Setting up firewalls
D. Use of one server in a network

7. File format is important in that it allows
A. The user to design his text according to a desired format
B. Files to be structured in a particular manner
C. The user to give his desired extension to a file
D. The operating system to allocate memory space to a file

8. In the file name GCE.TXT, what does the .TXT part represent?
A. File domain. B. File path.
C. File type. D. File content.

9. A method that can prevent illegal access to computer systems through networks is
A. Encryption of files B. Use of firewall
C. Use of antivirus software D. archiving

10. An example of a mono tasking operating system is
A. Windows B. Macintosh
C. MS DOS D. Linux

11. A flat file with respect to database is defined as a
A. File with single data item
B. Database held on a single file
C. Database with no data item
D. File with no undulations

12. A data type that can take only one of the two values TRUE or FALSE is known as
A. Boolean B. Character
C. Integer D. Binary

13. Which logic gate does the following truth table represent?

A	B	Output
0	0	0
0	1	1
1	0	1
1	1	0

A. AND B. NAND
C. XOR D. NOR

14. The device that sends information only to requesting computers in a network is known as a
A. Switch B. Node
C. Server D. Hub

15. Which of the following information systems analyses data on the displacement of people and mineral resources in a given region?
A. GIS B. HIS
C. EIS D. MIS

16. One advantage of high level programming languages over low level programming languages is A. It is written in a language understood by programmers
B. It is cheaper to get associated software
C. Software for high level programming languages are more common in the software market
D. It less bulky in relation to memory space

17. The letter A is represented in ASCII code by the binary pattern 01000001. Each character in the alphabet is allocated 8 bits sequentially. The letter C will be represented in ASCII code by:
A. 11000001 B. 01000010
C. 01000100 D. 01000011

18. A network that gives access to some users outside the organization is known as
A. The Internet B. Extranet
C. Internet D. Inter-networking

19. A query, in a database enables one to
A. Sort data according to a desired criterion
B. Sort data to an unreadable form
C. Arrange data chronologically
D. Correct data spelling

20. To maintain the integrity of transmitted data between two network components, what is being added to the transmitted data?
A. Character code B. Parity bit
C. Batch number D. Network address

21. The construction of a computer program from a collection of small workable programs whose interaction are integrated and rigidly restricted is
A. Top-down programming
B. Modular programming
C. Unit programming
D. Object-oriented programming

22. One terabyte is equal to
A. One thousand bytes B. One million bytes
C. One billion bytes D. One trillion bytes

23. A 32-bit computer can access how many bytes at a time?
A. 4 B. 2 C. 8 D. 16

24. Rewriting an algorithm in more detailed steps of simpler instructions is called
A. Stepwise refinement B. Recursion
C. Bottom-up design D. detail design

25. When two or more network topologies are put together, it is described as a …….. topology.
A. Mesh B. Tree
C. Hybrid D. Mixed

26. The formula to calculate the number of separate cables needed to connect a given number of computers (n) in a mesh network is given by

A. $n^2 /2$ B. n(n-1)/2 C. (n-1)/2 D. n(n-1)

27. Which of the following network media has the fastest data transfer rate?
A. Shielded twisted pair cable B. Fibre optic
C. Coaxial cable D. Backbone
cable

28. Which of the following is NOT a responsibility of the Internet Service Provider?
A. Provide access phone numbers
B. Provide access to the Internet
C. Provide file space of pages on the world wide web
D. Provide security of networks

29. Which of the following will least affect the speed of Internet connection?
A. Bandwidth
B. Speed of the modem
C. Type of communication medium
D. Type of browser

30. Internet users can locate and download materials on research topics from different servers around the world thanks to
A. Routers B. Search engines
C. Google D. Bandwidth

31. The line containing an error in an HTML code is given as <b><i>This is John<b></i> The error in the code is
A. The closing tags are in the wrong order
B. There is no space between the text and the tags
C. The tag <b> is not closed
D. The two tags used are never used together

32. Technology seems to be an important resource in education today. Which of the following is NOT TRUE about computer assisted learning?
A. Increases student-student interaction skills
B. Uses interactive teaching packages available on CDs for many subjects
C. Increases school attendance through distance learning
D. Provides facilities for students with disabilities

33. One activity carried out during the implementation phase of a computer system is
A. Writing programs B. Designing
C. Training of users D. Calculating cost

34. Which control statement exits execution when the condition evaluates to true?
A. WHILE statement B. FOR statement
C. REPEAT statement D. IF-THEN statement

35. The method of accessing-files stored in a compact disk is
A. Sequential B. Random
C. Indexing D. Bubble sort

36. The performance of a system is most affected by
A. Monitor size B. Hard drive size
C. CPU size D. The RAM size

37. The quality of the images viewed in the monitor is determined by
A. Processor speed
B. Size of the monitor
C. Strength of the video controller
D. Brightness of the environmental

38. The software that converts codes written in a high-level programming language into machine code is the
A. Interpreter B. Compiler
C. Editor D. Assembler

39. A variable that is useful only within a routine in which it is declared is known as a
A. Global variable B. Function variable
C. Dynamic variable D. Local variable

40. A method of programming which focuses on how a problem is solved is known as
A. Procedural programming
B. Functional programming
C. Procedural abstraction
D. Object-oriented programming

41. Which of the following is NOT a concern in project management?
A. Building a project team B. Evaluating cost
C. Lobbying for sponsors D. Identifying tasks

42. The level of management which provides an organization with overall direction, guidance and long term planning is
A. Tactical management
B. Strategic management
C. Operational management
D. Long term management

43. Tasks that must be executed in order that the finish date of a project is not affected are called
A. Milestones B. Strategic tasks
C. Critical tasks D. Floating tasks

44. A technique of project planning that analyzes the time required for each activity in a project is known as
A. Waterfall model technique
B. Time Sharing Technique
C. Mile stone techniques
D. Gantt chart technique

45. A file compression software is an example of
A. Defragmentation software
B. Application software
C. Bespoke software
D. Utility software

46. The protocol of communication between the browser and the web server is
A. HTTP B. FTP
C SMTP D. TCP

47. The science that designs work environment to ensure comfort and good health for workers is known as
A. Ergonomics B. E-health
C. Green computer D. E-protection

48. Some organizations allow workers to do office work from home via a computer network. This type of practice is termed
A. Teleconferencing B. Distance working
C. E-working D. Teleworking

49. A spreadsheet formula to calculate the average of numbers in 4 cells is given as =AVERAGE(Al:D1)/4. The formula is wrong because
A. the range does not contain only four cells
B. An addition sign is missing within the brackets
C. the division by 4 makes the formula wrong
D. the colon sign (:) should be changed to a hyphen (-)

50. A chip in the computer that stores essential information in a computer such as the date and time is the
A. BIOS B. CMOS
C. RAM D. ROM

CGCEB JUNE 2018

1 Which of the following input devices is the most appropriate to mark correct answers of multiple-choice questions on an answer sheet?
A. Optical mark reader.
B. Scanner.
C. Magnetic mark reader.
D. Magnetic character reader.

2. What is the main advantage of networking?
A. Cost reduction. B. Sharing of resources
C. Advanced technology. D. Internet services.

3. A software used to prevent intruders from gaining access into networks is called a(n)_____
A Anti-virus. B Malware. C Firewall. D Spyware.

4. A network type suitable for a large electricity corporation which has offices in all regions of the Republic of Cameroon is a
A. LAN. B. WAN.
C. MAN. D. WLAN.

5. Which of the following is most likely to be true about computer networks?
A. The further apart the computers are, the slower the communication is.
B. The more the computers, the more difficult it is to communicate.
C. Virus spread more in WANs than is LANs.
D. The more the users, the more insecure the network is more likely to become.

6. Which of the following explains the effect on a client-server network of bus topology when a client breaks down?
A. The network fails.
B. Only the computers on the side of the server function.
C. The network continues to function.
D. The other computers will improve in performance

7. Select the best option if the cable of the file server in a star network breaks
A. The network remains functional but no file from the server can be retrieved.
B. The system stops functioning and no file from the server can be retrieved.
C. All services of the server stop but its Internet services remain functional.
D. Another computer plays the role of the file server and the system stays on.

8. Information used by a router to determine the destination of each piece of data is contained in a
A. Configuration table. B. TCP/IP.
C. Packet of data. D. Network board.

9. The situation in which users of an intranet work together in groups using web cameras is
A. Distance working. B. Videoconferencing.
C. Distributed computing. D. Blog working.

10. A command line interface is different from a graphical user interface in that
A. It is not text-based.

B. Commands are given using menus.
C. It requires a mouse.
D. Doesn't require users to have knowledge of commands.

11. Which of the following is NOT an example of a pointing device?
A. Keyboard. B. Joystick.
C. Mouse. D. Light pen.

12. The name given to files that have been reduced in size is
A. Coded files. B. Compressed files.
C. Shrunken files. D. Decoded files.

13. Software designed to disturb the functioning of a computer system is called a
A. Cookie. B. Virus.
C. Spyware. D. Driver.

14. Which of the following is a storage device?
A. Memory card reader. B. Flash disk.
C. DVD. D. Floppy disk.

15. A multimedia resource may combine several elements such as
A. Video, text and speakers only.
B. Text and graphics only.
C. Text sound, graphics, animation and video only.
D. Text and sound only.

16. Backup of data files will usually help to prevent:
A. Virus infection. B. Loss of authenticity.
C. Duplication of data. D. Loss of data.

17. Which software would you use to write a textbook?
A. Web browsing software.
B. Spreadsheet software.
C. Word processing tutorial.
D. Word processor.

18. Which of these is true of a System Development Life Cycle?
A. It is managed by a system analyst.
B. Gives the duration of the project
C. Has eight phases of development.
D. It is used to manage a project.

19. Which of these is NOT used as a software development model?
A. Navigation. B. Prototyping.
C. Boehm spiral model. D. Waterfall model.

20. Which of the following is a low-level language?
A. COBOL language. B. FORTRAN language.
C. ALGOL language. D. Assembly language.

21. Exactly, how many bytes are in 2.5 kilobytes?
A. 256 B. 2560 C. 2524 D. 2512

22. The clock speed of a CPU is measured in
A. Bits per second. B. Hertz.
C. Cycles per second. D. Bytes per second.

23. The correct order of the stages for a system development life cycle is
A. Analysis, Feasibility Study. implementation, Design.
B. Analysis, Design, Feasibility study, implementation.
C. Feasibility study, Analysis, Design, implementation.
D. Feasibility study, Analysis, implementation, Design.

24. In SDLC, the collection of information by means of interviews, questionnaires observation and inspection of documents is an activity in
A. System analysis.
B. System investigation.
C. System specification.
D. Information requirement.

25. What data type do we use for a variable called FOUND which asserts the presence of an element in an array of numbers?
A. Real. B. Boolean.
C. Integer. D. Number.

26. An information system that manages on-line requests of hotel clients is termed a
A. Geographic information system.
B. Real-time system.
C. Management information system.
D. Batch processing system.

27. Which of the lists below contains only input devices?
A. Mouse, webcam, MICR.
B. Printer, keyboard, scanner.
C. Mouse, printer, speakers.
D. Microphone, mouse, flash disk.

28. Which of the following are Magnetic storage media?
A. Floppy disk and USB flash disk.
B. DVD and CD.
C. Hard disk and Floppy disk.
D. Hard disk and DVD.

29. A device that captures data to be processed by the computer is called a(n)
A. Storage device.
B. Connecting device.
C. Communication device.
D. Input device.

30. Which of the following best describes the purpose of a communication system?
A. Communicates messages over the radio, TV and telephones.
B. Transports data and information.
C. Manages data and information.
D. Controls activities of a company.

31. Which of the following lists contains only output devices?
A. Printer, monitor, keyboard.
B. Scanner, Printer, monitor.
C. Modern, router, switch.
D. Loudspeaker, monitor, Printer.

32. A program that translates a source code from a high-level programming language to a lower-level language is called a
A. Assembler.
B. Converter.
C. Decoder.
D. Compiler.

33. Which of the following is an Internet search engine?
A. Yahoo! Mail.
B. Yahoo! Messenger.
C. Mozilla Firefox.
D. Yahoo.

34. Data is transmitted over the Internet as
A. Data packets.
B. IP signals.
C. IP packets.
D. Data waves.

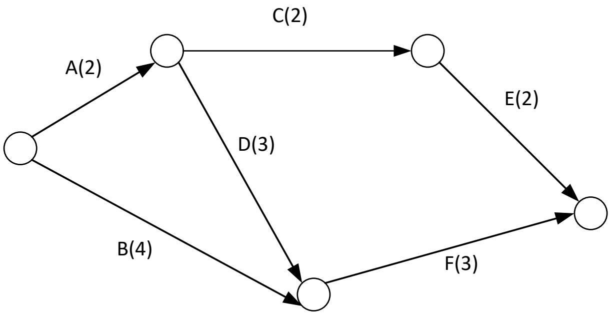
35. The memory that loses its information when the system's power is switched off is said to be
A. Volatile.
B. Power dependent.
C. Short term.
D. Interrupted memory.

36. Which of the following scenarios best describes intranet?
A. It is a network that provides Internet services only to some computers.
B. It is a private network that functions like the Internet.
C. It is a Local Area Network on the world wide web (www).
D. It is any network that has Internet.

37. Which of the following describes the stages of the machine cycle?
A. Input, decode, execute.
B. Fetch, processing, input.
C. Fetch, decode, execute.
D. Input, storage, output.

38. A service which can be used by the state of Cameroon to provide online services to its citizens is known as
A. E-mail.
B. Web routing.
C. Legislation.
D. E-government.

39. The PERT chart below shows tasks A to F of a project with the duration of each task in brackets.



The critical path of the project is
A. A, D, F.
B. A, C, E.
C. B, D, C,
D. D B, F.

40. The amount of time by which a project task may be extended or delayed without delaying other tasks is known as
A. Lag time.
B. Slack time.
C. Lead time.
D. Extra time.

41. A task that shows an achievement in a project with zero duration is
A. Critical task.
B. Float task.
C. Milestone.
D. Slack task.

42. Which of the following terms best describe what a project has to accomplish?
A. Target.
B. Task.

C. Constraint. D. Scope.

43. An electricity cooperation calculates the amounts to be paid by its clients as follows: those who consume less than 100 units per month pay 50frs per unit; those who consume 100 units and above pay 75frs per unit. What algorithmic structure can be used to solve the problem?
A. Recursion. B. Repetition.
C. Loop. D. Choice.

44. Which of the following data structures is referred to as a LIFO (Last In First Out) abstract data type?
A. List. B. Queue.
C. Stack. D. Tree.

45. Translating an algorithm into a programming language is called:
A. Coding. B. Computing.
C. Interpreting. D. Debugging.

46. Study the algorithm below.

```
Get a positive integer, N
If N < 3
    Set P to 3*N/2
ELSE
    Set Y to 5*N/2
    SET P to Y-4
ENDIF
    PRINT P
```

What is the value of P given that the value of N at the beginning is 6?
A. 11 B. 9 C. 5 D. 15

47. Which of the following loop construct will execute at least once even if the test expression in false
A. For. B. DO-While. C. While D. If

48. Which of the following is true of Gantt Charts?
A. They show the percentages of different tasks in a project.
B. They allow the manager of a project to monitor the progress of a project.
C. They are a group of Pie charts that are connected to give a project manager an idea of how projects are related.
D. They are charts on which the project manager records finished tasks.

49. A program that needs to be compiled before execution is in
A. Low-level language. B. High level language
C. Machine code D. Compilation code

50. When a code is compiled a(n) is produced.
A. Output B. File
C. Object code D. Source code

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1. A(n)........ is installed when a new hardware is connected to the computer:
A. Defragmenter B Device Driver
C. Operating system D Translator

2. A technique that can capture data by converting text information on paper into editable text in the computer.
A. OCR B. MICR
C. Scanning D. OMR

3. Components in the CPU communicate through the:
A. NIC B. RAM
C. Register D. Bus

4. Eyestrain can be reduced by:
A. Reducing room light intensity.
B. Using LCD monitors.
C. Using CRT monitors.
D. Avoiding breaking eye contact with monitor.

5. Which of the following is a volatile medium?
A. DVD B. Main memory
C. ROM D. Flash memory

6. A task in a project was programmed to take 6 days although it can be finished in 4 days. This task is said to:
A. Be a lag task. B. Be a critical task.
C. Have a successor. D. Be a milestone task.

7. The technique of developing a system model and testing to make adjustments until an acceptable product is realized is known as:
A. Waterfall technique. B. SDLC.
C. Flow charting. D. Prototyping.

8. The equivalence of the binary number 111110 in hexadecimal is:
A. 3E B. F2 C. 76 D. D3

9. A tool necessary to make payments in e-commerce is:

A. ISP
B. ATM
C. Credit card
D. ADSL

10. The component that is used by the computer to represent data is:

A. Keyboard
B. Logic Gates
C. Motherboard
D. Control unit

11. A network topology in which each device is directly connected to all other devices by a separate cable is known as:

A. Ring
B. Star
C. Mesh
D. Hybrid

12. A measure that will ensure that transmitted data is error free is known as:

A. Data Debugging
B. Data Integrity
C. Data Encryption
D. Data validity

13. If two users attempt to update the same record in a database,

A. The DBMS blocks the record to one user.
B. The DBMS will freeze.
C. The DBMS will allow both updates to be saved.
D. the DBMS will shut down.

14. Which of the following are stages of the machine cycle in the control unit?

A. Control, Execute
B. Fetch, Execute
C. Execute, store
D. Decode, Fetch

15. Study the algorithm below

```
Start
    Give two integers, N and M
        If N is greater than M
            Then Set M to M-2
            Else Set M to N+3
EndIF
    Print M
Stop.
```

Given that the input in the first statement are N=5, M=7, what is the value of the output?

A. 15
B. 8
C. 13
D. 5

16. Which of the following is NOT an activity in the design phase of system development?

A. Selecting hardware needed
B. Writing algorithms
C. Draw up strategies for implementation
D. Writing codes for interface

17. Voters e-registration can be described as

A. E-Government
B. Electronic census
C. On-line voting
D. Electronic capture

18. Bits of data from many wires are to be transmitted over a single wire. The device needed to do this is:

A. Modem
B. Bus
C. Multiplexer
D. Switch

19. The control structure that executes a set of instructions a number of times based on a condition is called a?

A. Logic
B. Choice
C. Loop
D. Sequence

20. A system building tool that can be used to predict failures:

A. SDLC
B. Simulation
C. Try-by-error
D. Top-down

21. The software that attributes file formats is:

A. Application software
B. Kernel
C. Operating system software
D. Format

22. Any instruction to be processed by the CPU must be broken down to correspond to the....

A. ALU
B. Instruction set
C. Program
D. Instruction cycle

23. The method used by organization to completely do away with the old system to use a new system is known as …………. implementation?

A. Direct
B. Complete
C. Parallel
D. Piecemeal

24. Communication circuits that transmit data in both directions but not at the same time are said to be operating in?

A. Simplex mode
B. Half-duplex mode
C. Asynchronous mode
D. Full-duplex mode

25. A software that can convert codes written by programmers into machine code is:

A. Defragmenter
B. Operating System
C. Application software
D. Compiler

26. A design method that uses successive improvement on a model to arrive at the desired result is….

A. Iteration
B. Simulation
C. Prototyping
D. SDLC

27. The protocol that defines the process of requesting and transferring HTML webpages

A. FTP
B. TCP
C. HTTP
D. POP3

28. Which of the following is utility software?

A. Compression software
B. Operating system
C. DBMS
D. Word processor

29. The process that programmers take to eliminate errors in a code is known as?

A. Debugging
B. Syntax
C. Simulation
D. Prototyping

30. Which of the following enables the monitor to display images?

A. Motherboard B. Monitor viewer
C. Video controller D. Video player

31. Consider the sentence below:
John is a *boy*
The HTML statement for the sentence is:
A. John is a <i>boy</i>
B. <i>John is a boy</i>
C. John is a <i>boy</i>
D. John is a <i>boy</i>

32. Which of the following is a pointing device?
A. Touchpad B. Keyboard
C. Monitor D. Scanner

33. The equivalence of the Boolean expression $\boldsymbol{NOT}(A + \boldsymbol{\bar{B}})$ is:
A. $\bar{A} \cdot B$ B. $\overline{\bar{A} + B}$
C. $A \cdot \bar{B}$ D. $\bar{A} + \bar{B}$

34. Two students communicating through the Internet noticed that the communication speed was slow. The most probable reason could be?
A. Poor computer performance
B. Small RAM size
C. The bandwidth is low
D. The distance of the users is wide

35. The technology that can be used by a teacher to simultaneously deliver live lectures to students in more than one location:
A. Teleworking
B. Distance learning
C. Video conferencing
D. Computer assisted learning

36. The business organization that sells Internet access to people is known as:
A. ISP B. Google
C. Microsoft D. Linux

37. Parts of the same file that are scattered within the hard disk can be arranged to exist together by?
A. Antivirus software B. Operating system
C. Translators D. Defragmenter

38. Which of the following **CANNOT** tell the duration of a projects?
A. Gantt chart B. SDLC
C. Critical path analysis D. PERT

39. The device that selects the path to be taken by network signals as they move from one network to another is:
A. Server B. Bridge
C. Switch D. Router

40. A procedure that verifies that a user of a computer system is genuine is called?
A. Authorization B. Authentication
C. Identification D. Encryption

41. $1101_2 + 1001_2 =$
A. 11010 B. 11111
C. 10110 D. 10101

42. A system that can predict weather condition is called:
A. Transaction processing system
B. Geographic information system
C. Management information system
D. Knowledge based system

43. A user of the Internet can be confident that information sent to a friend will only be received by him. This is possible through:
A. Hyperlinks B. URL
C. Protocol D. Packets of data

44. A language that can be used to extract specific information from a database is:
A. Pascal B. SQL
C. BASIC D. Query

45. A hardware device that controls access between the Internet and the computer system is:
A. Proxy server B. Firewall
C. Active switch D. Router

46. A process that will translate a code written in high level language to a machine code is:
A. Compilation B. Debugging
C. Decoding D. Synthesis

47. An advantage of writing codes in machine language is?
A. It needs to be compiled
B. The code executes faster
C. Coding is easier to understand
D. Little memorization is needed

48. A series of strings that identify a resource by its network location is known as?
A. IP address B. Website
C. Protocol D. URL

49. A process in which a customer gains access to a company's computer network for malicious intentions is called:
A. Hacking B. Masquerading
C. Phishing D. scamming

50. A system that accumulates data for a period of time before processing takes place is called:
A. Transaction system B. Real-time system
C. Batch system D. Reservation system

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1. Which of the following is most likely to slow down a computer's performance?
A. Increasing the number of output devices
B. Increasing the capacity of the cache
C. Increasing the number of running processes
D. Increasing the capacity of the RAM

2. Which technology innovation characterized 3rd generation computers?
A. Integrated Circuits B. Transistors
B. Vacuum Tubes D. Microprocessors.

3. Which of the following best describes the backup process of computer data in case of disaster
A. Reversing the files stored on the hard drive
B. Make an extra copy of the data on the hard disk partition
C. Make an extra copy of the data of the external storage device.
D. Creating a backup folder on your desktop

4. The expression $B12_{16} + 5CA_{16}$ evaluates to:
A. $1F42_{16}$ B. $20DC_{16}$
C. FDC_{16} D. $10DC_{16}$

5. Which of the following best assists students to improve to improve on their ICT knowledge and educational standards?
A. Access to computers
B. Pedagogic training on the use of ICT
C. Access 10 computers on a LAN
D. Provision of internet and multimedia facility tools

6. What is the full meaning of the following network type, VPN?
A. Verified Protected Network
B. Virtual Protected Network
C. Verified Private Network
D. Virtual Private Network

7. Which one of the following statements is **NOT** true about tables?
A. Each column of a table represents a field
B. Each row of a table represents a record.
C. Each record in a table contains unrelated collection

8. Data transmission rate usually refers to:
A. The amount of data that can be stored on a server line.
B. The amount of data that can be stored on LAN server
C. The speed of uploading /downloading on an online server
D. The speed of uploading/downloading on a local hard disk

9. A management information system is used to:
A. Create and share documents that support day-to-day office activities.
B. Process business transactions.
C. Produce reports from transaction data needed by managers to run the business.
D. Captures and reproduced the knowledge of an expert problem solver.

10. Which one of the following describes Voice over Internet Protocol (VoIP)?
A. A voice recognition program over Internet.
B. Technology that enables the delivery of telephone conversations over the Internet.
C. A rule that defines the transmission of data over the Internet.
D. Real-time text - based communication between two or more people over the Internet

11. Quality Developer is a company that writes programs to do specific jobs for other companies. These programs are called?
A. Customized- purpose software
B. General - purpose software
C. Off-the - shelf software
D. Special-purpose software

12. Which of the following statement is **FALSE** concerning file names?
A. Files may share the same name or the same extension in the same location.
B. The file name comes before the dot (.) followed by the file extension.
C. File extension denotes the file type.
D. Every file in the folder must have a unique name.

13. Data integrity constraints are used to:
A. Control who is allowed access to the data.
B. Ensure that duplicate records are not entered into the table.
C. Improve the quality of data entered for a specific purpose.
D. Prevent users from changing the data values.

14. Choose from the following statements the one which is **NOT** a function of an Operating System.
A. To keep system programmers employed.
B. To make computers easier to use.
C. To make the most efficient use of the computer hardware
D. To allow people to use the computer.

15. Which one of the following statements about Software End User License Agreement is **True**?
A. It gives the user the exclusive right to copy and sell the software to other potential users
B. It gives the user the right to modify the software.

C. It gives full ownership of the software to the user of the software.
D. It gives the user the right to install and run the software on a specified number of computers.

16. Which of the following is **NOT** a web browser?
A. Google Chrome
B. Opera Mini
C. Yahoo
D. Internet Explorer

17. A data transmission process which does not use start or stop bits or gaps is called:
A. Synchronous
B. Asynchronous
C. Full Duplex
D. Simplex

18. An airline reservation system is an example of:
A. Batch Processing
B. Real Time processing
C. Interactive processing
D. Distributed Processing

19. An information system that represents information in a map form is called:
A. HIS
B. EIS
C. GIS
D. LIS

20. The e-commerce domain that involves business activities initiated by the consumer that targets a firm is known as:
A. Customer - to - Customer (C2C)
B. Customer - to - Business (B2B)
C. Business - to - Customer (B2C)
D. Business - to - Business (B2B)

21. Which of the following is a rare option when an anti-virus detects an infected file?
A. Quarantine
B. Delete
C. Open
D. Clean

22. In which aspect is the analog computer better than the digital computer?
A. Speed
B. Accuracy
C. Efficiency
D. Reliability

23. A network topology where network components are connected physically to the same cable trunk is
A. Star
B. Ring
C. Bus
D. Mesh

24. A data structure that stores homogenous data elements is:
A. Arrays
B. Fields
C. Records
D. Files

25. A pile in which items are added at one end and removed from the other is called?
A. Stack
B. Queue
C. List
D. Table

26. Which of the following is **NOT** a basic quality if information security?
A. Availability
B. Locality
C. Accessibility
D. Integrity

27. An advantage of teleworking is:
A. Lays more emphasis on teamwork
B. Allows flexible working hours
C. Allows more commuting time
D. Reduces office space

28. Which type of visual object is used to analyze and represent the tasks involved in completing a project?
A. Flowchart
B. Critical path chart
C. Overflow chart
D. Gantt chart

29. A conversion technique in which the system is introduced one part at a time is called?
A. Plunge conversion
B. Parallel conversion
C. Pilot conversion
D. Piecemeal conversion

30. Someone physically monitoring you while entering your pin code at the ATM without your consent is said to be?
A. Phishing
B. Shoulder surfing
C. spoofing
D. Cracking

31. The expression 00001011 + 00001110 evaluates to:
A. 000011001
B. 000011101
C. 000010110
D. 000010011

32. To be able to create, view, change or delete data on a computer system you will need:
A. Access rights
B. Copy rights
C. Sign-in rights
D. Entry rights

33. A supermarket with a new inventory system will need what type of software in managing it?
A. Business Software
B. Marketing software
B. Accounting software
D. Stock Control software

34. Which one of the following is **NOT** a feature of electronic commerce
A. Goods can be advertised and prices compared.
B. Transactions can be processed quickly
C. There is facial contact between buyer and seller
D. Services are available 24hours a day.

35. User requirement in an information system can be verified by?
A. Acceptance test
B. Unit Test
C. Integrated test
D. Alpha test

36. Which of the following information systems best assists managers to deal with transactions that cannot be answered by reports from operational or tactical systems?
A. Transaction Processing System
B. Decision Support System
C. Office Automation System
D. Management Information System

37. The protocol used to send and receive electronic mails over the internet is?
A. TCP/IP
B. FTP

C. SMTP
D. VoIP

38. The programming language that is characterized by use of mnemonics is?
A. Assembly language
B. High level language
C. Machine language
D. Procedural Language

39. Which type of software controls the allocation of resources and software on the computer?
A. Network software
B. Operating system software
C. Application Software
D. Security Software

40. Which of the following shows the sequence of the operation of the microprocessor?
A. Fetch, Encode, Decode
B. Fetch, Encode, Execute
C. Fetch, encode, decode, execute
D. Fetch, decode, execute

41. The De Morgan's Law for the logic OR states that $\overline{A+B}$ =
A. $\overline{A.B}$
B. A + $\bar{B}$
C. $\bar{A}$ + B
D. $\overline{A}.\overline{B}$

42. Which of the following best describes a fundamental purpose of project management?
A. Delivering change management
B. Planning and tasks management
C. Controlling progress management
D. leadership and Team Management

43. Which of the following best describes malware that will replicate itself and uses a computer network to send copies to other computers?
A. Trojan Horses
B, Rootkits
B. Worms
D. Backdoors

44. Which of the following devices sends data packets only to a receiving device?
A. Hub
B. Switch
C. Bridge
D. Repeater

45. Which of the following best describes a document created with an application package which could be used repeatedly by many users for similar purposes?
A. Template
B. Wizard
C. Macro
D. Form

46. The buying and selling of stocks over the Internet is called:
A. E-commerce
B. E-banking
C. E-shopping
D. E-trading

47. If two users attempt to update the same record in a database.
A. The database blocks the record to one user.
B. The database will freeze.
C. The database will allow both updates to be saved.
D. The database will shut down.

48. An advantage of a vector-based graphic format is:
A. Quality does not change during resizing.
B. Quality becomes sharper when sealed-up.
C. Graphs can be placed in a vector form.
D. It allows graphs to be converted to data.

49. A table with central glass tube covered with protective shield which transmit data using photons over long distances is:
A. Coaxial cable
B. RJ45
B. Optic Fibre
D. Twisted Pair

50. Select the method that best describes a programming paradigm that uses modules containing both data and processing operations:
A. Imperative Programming
B. Object-orientated programming
C. Functional Programming
D. Procedural Programming

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1. Which of the following components of the computer can be used as both input and output device?
A Digital keyboard
B Digital versatile disk
C Visual display unit
D Laser printer

2. Which of the following is NOT true about databases?
A Information sharing
B Security of information
C Data integrity
D Increase data redundancy

3. Which of the following is NOT a project management technique?
A PERT chart
B GANTT chart
C CPM
D SDLC

4. If the implementation of a new system is tried out only in a part of the organisation, it is described as:
A Pilot implementation
B Phased changeover
C Piecemeal changeover
D Parallel implementation

5. Optical storage devices employ:
A Ultraviolet light
B Electromagnetic fields

C Optical couplers
D Laser beams

6. The speed of the processor of an android phone is measured in terms of :
A Nano Hertz
B Pico Hertz
C Mega Hertz
D Kilo Hertz

7. Encryption and decryption provides confidentiality but NOT:
A Privacy
B Authentication
C Integrity
D Patent Right

8. The transmission mode between a radio transmitter and a receiver is known as:
A Asynchronous
B Synchronous
C Simplex
D Full duplex

9. Which of the following best describes mono tasking operating system?
A The operating system is designed for a particular program
B Only one user is allowed to use the system
C Only one program can run at a time
D Only one program can run in that system

10. The result of the arithmetic operation 1001101 + 111000 in binary is:
A 11000101
B 11100101
C 10000101
D 11110101

11. The information system that does NOT generate any organized information is:
A DSS
B MIS
C TPS
D EIS

12. A stepwise refinement approach in system development is used in:
A Outsourcing
B Prototyping
C Rapid application development
D Waterfall method

13. One major benefit of using barcode is
A It provides detailed information on all key aspects of the product
B It provides the selling price of the product
C It provides the identity of the shop
D It provides the name of the product

14. The interactive transmission of data within a time-sharing system may be best suited by:
A Simplex lines
B Half duplex lines
C Full duplex lines
D Duplex lines

15. A code written by a programmer is called:
A Source code
B Syntax code
C Object code
D Instruction code

16. A cash dispenser which can also give a report of the current balance in a customer's account is an example of:
A Real time processing
B Batch processing
C Time-sharing processing
D Multitasking processing

17. convert the decimal number 345 to binary.
A 101110011
B 101010101
C 110001101
D 101011001

18. Which of the following registers carries the address of the next instruction to be executed by CPU?
A Instruction register
B Accumulator
C Memory bus register
D Program counter

19 The importance of a query in a DBMS is:
A Extract specific information stored in one or more tables based on a given criterion.
B Provide user friendly interface to edit information on tables
C Provide interface to enter information to specific records
D Link information from several tables into one

20. A suitable information system for salespersons is:
A MIS
B EIS
C GIS
D TPS

21. A tool used in SDLC to model a new system from a logical point of view is:
A Data flow diagrams
B Flow chart
C PERT chart
D Simulation

22. Which of the following is a step used in software development by prototyping?
A Identify basic requirements of software
B System analyst makes logical appraisal
C Collection of data about the old system
D Purchase of hardware needed.

23. A precise report generated by an MIS to call for the attention of an unusual event to alert managers is called:
A Periodic report B Exception report
C Demand report D Summary report

24. The performance of a computer is mostly determined by:
A The speed of the operating system and memory size
B The speed and the number of input/output it can handle
C The processor speed and memory size
D The size of the BIOS and memory size

25. The general form of the IF statement is:

A	IF <condition> DO <statement>
B	IF <condition> TIIEN <statement>
C	DO <statement> UNTIL <condition>
D	DO <statement> IF <condition>

26. The system development model that does NOT allow overlapping of phases is called:
A Waterfall model B Spiral model
C V shape model D Iterative model

27. A URL is the full address for an Internet resource. What does it specify?
A The provider of the resource
B The location of the resource
C The access rule of the resource
D The identity of the user of the resource

28. System evaluation and feedback are key features of what phase of the SDLC?
A Implementation B Maintenance
C Design D Analysis

29. The IF-THEN is an example of a/an
A Sequential statement
B Repetition statement
C Selection statement
D Iteration statement

30. How many DVDs of size 8GB capacity can be used to backup an 8 terabyte external hard disk?
A One thousand B One million
C One billion D One trillion

31. Which of the following is NOT commonly associated with online learning?
A Lecture notes B White board
C Calendar D E-mail

32. Which of the following programming languages is NOT machine independent?
A Assembly language
B C programming Language
C Pascal programming Language
D JAVA programming language

33. A type of virus that replicates itself within a system overload the system resources is:
A Worms B Trojans
C Adware D Spyware

34. Which of the following is NOT a mobile operating system?
A IOS B Android
C Opera Mini D Windows

35. From the Gantt chart. one cannot easily identify:
A When tasks are to begin and end
B Which tasks are occurring simultaneously
C Which tasks are dependent on others
D The cost of executing each tasks

36. Which of the following can be used to validate a designed algorithm?
A rest data B Output
C Processes D Constants

37. A software licence that makes the source code available to anyone who wants to modify is:
A A freeware B A shareware
C An open source D A trial software

38. Which of the following is a risk associated to cloud computing?
A Automatic updates
B Enhanced mobility
C Easy exposure data
D Scalability

39. Data is represented in CD-ROMs by
A Switches B AND and OR gates
C 0’'s and 1's D Pits and lands

40. Which of the following is a limitation of E-commerce?
A Products can be sold at cheap prices

B It needs a small number of staff
C Specialised software are needed
D It does not need huge office space

41. The principle of the Data Protection Act (1998) is:
A Data should be processed immediately
B Data should be valuable
C Data should not be stolen
D Data should be kept up to date

42. Which of the following is NOT a basic requirement to set up online communication?
A A computer
B A modem
C A telephone
D A web camera

43. Arrange in order from fastest to slowest access time:
A Tape-cache-main memory-registers
B Registers-cachezmain memory-magnetic Tape
C Main memory-cache-Tape-registers
D Cache- registers-Tape-main memory

44. A device that links several devices to a common channel:
A Access point B Switch
C Bridge D Router

45. When part of a table depends on a field in the table that is not the table's primary key, it is known as:
A Transitive dependency
B Partial dependency
C Pre-relational dependency
D Foreign key

46. Which one of the following filing systems is commonly associated to 64 bits operating system?
A eFAT B NTFS
C FAT64 D FAT32

47. A utility that optimises the hard disk by putting some file content in a contiguous area is:
A Disk clean up B Disk defragmenter
C Disk restore D Disk compression

48. An application used by programmers to create source code, debug a code and manage the program is known as:
A Compiler
B Interpreter
C Editor
D Integrated Development Environment

49. Which of the following is NOT an Internet connection option for mobile devices?
A 4G B WiFi
C Android D Winmax

50. The use of online tutorial lessons to prepare for examinations is known as
A E-learning B Computer aided learning
C Distance learning D Electronic studies

SECTION I-B: Long Structure Questions, PAPER II

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1)(i) Explain Briefly the meaning of each of the following terms giving examples where necessary

(a) Automation
(b) HTML
(c) DBMS
(d) Data Flow Diagrams (DFD)
(e) Data Protection (15marks)

ii) How does the Data Protection Act define the following terms?

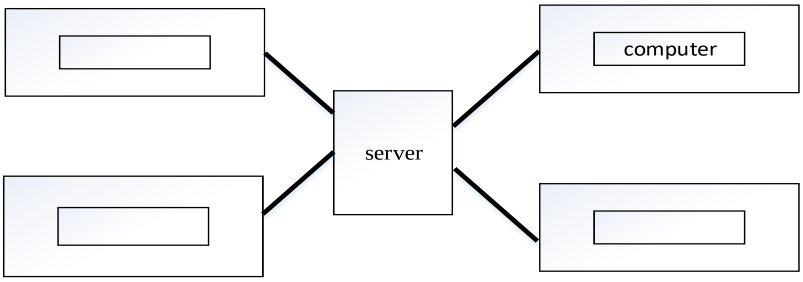
(a) Data
(b) Data subject
(c) Personal data. (5 marks)

2) i) a) What is teleworking? (2 marks)

b) List two advantages of teleworking to a teacher. (2 marks)

c) List and describe two advantages of teleworking to a school. (4 marks)

ii) Below is a diagram of the structure of a typical network topology



(a) Give the name of the network topology above. Give the name of another typical network topology. (2 marks)

(b) Give two reasons why it is better for students to use networked computers. (2 marks)

(c) List two functions of a file server on the network. (2 marks)

(d) The school has an intranet which students can log on from home through a WAN.

(i) Explain the meaning of WAN. (2 marks)

(ii)List two different ways in which the intranet can help students in their studies. (2 marks)

3)i) a) What is ergonomics? (2 marks)

b) List and explain three physical health matters related to the use of computers. Give possible ways of avoiding each of these problems. (6 marks)

ii) a) Explain the use and functioning of the following

- Bar code readers
- Optical Mark Recognition (OMR). (6 marks)

b) List two main functions of each of the following hardware

- Video card

- Sound card
- Network Interface Card

4)i) (a) Explain the meaning of the term data. (2 marks)

(b) List and explain two main threats to the safety of data and for each give two measures which are used to fight against it. (6 marks)

ii) (a) Explain how each of the following methods could be used to implement a system

- Parallel running
- Direct changeover
- Phased implementation. (3 marks)

(b) Give one advantage and one disadvantage of each of the methods in (ii)a. (6 marks)

5) Read the text below and answer the questions that follow:

APPLICATION CONTROL STANDARDS (ACS)

ACS includes policies and procedures associated with user activities and the automated controls designed into applications. Controls could be in place to address both batch and on-line environments.

ACS enhances the security, integrity, and reliability of automated systems by ensuring that input, processed and output information are authorized, accurate, complete and secure. Management considers these issues at the outset of a project and includes them as soon as possible in applications and systems design. Controls are usually categorized as preventive, detective or corrective. Preventive controls are designed to prevent unauthorized or invalid data entries. Detective controls help identify unauthorized or invalid entries. Corrective controls assist in recovering from unwanted occurrences.

i) What do you understand by batch and on-line environment as used in the text. (4 marks)

ii) Give the purpose of automated input controls in (i). (3 marks)

iii) Group the following control methods in preventive, detective and corrective controls.

Check digits	Completeness checks
Range checks	Duplication checks
Format checks	Error reporting
Limit checks	Validity checks

(8 marks)

iv) Explain how you will implement formal and range checks in a spreadsheet. Use examples from: Name, Sex, Date and Marks fields.
(5 marks)

6)i) (a) Explain the meaning of the term ‘’expert system’’. (4 marks)

Give two situations where expert systems are used other than in playing the game of chess. (b) Describe how a user interacts with an expert system. (3 marks)

ii) (a) Name and describe two types of electronic conferencing techniques giving the special hardware required for each type. (6 marks)

(b) Give two benefits to an organization and its employees of using electronic conferencing techniques.

(2 marks)

iii) State three advantages and three disadvantages of using e-mail. (5 marks)

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7)(i) Name four computer crimes in Cameroon and briefly describe each of them. (4 marks)

(ii)For any two of the crimes you state for each, two ways that you can use to prevent them(4marks)

(iii)State and explain two reasons why a data protection law is necessary in Cameroon. (4marks)

iv) Briefly describe what the following computer professionals do:

(a) Database administrator
(b) Systems analyst
(c) Computer programmer
(d) Networks system administrator. (8 marks)

---

8)i) High level languages are machine independent while low level languages are machine oriented

a) Give one example of a high level language. (1 mark)

b) Explain the meaning of the following two terms:
- Machine independent
- Machine oriented. (3 marks)

c) Low level and high level languages are different. List three features of each language level that is not found in the other. (6 marks)

ii) In a given firm, the wages of workers are calculated as follows:

- Wages depend on hours worked and pay rate (amount per hour)
- Wages for extra hours greater than 40 have rate of 1.5 times per rate.

a) Write and algorithm that receives the number of hours worked and the pay rate as input and the calculates the wage of a worker. (7 marks)

b) Use your algorithm to calculate the wage of a worker who worked for 43 hours at a pay rate of 1,000frs. (3 marks)

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9)i) Distinguish between network topology and network configuration. (2 marks)

ii) Name and describe two types of network configurations. (4 marks)

iii) You were asked to design computer networks in different geographical areas. Choose what type of network you will design for the ones below.

a) A network to link a laptop, a desktop, a digital camera and a PDA in a corner of a room
b) A network to link all the networks of a multinational company' s offices in two continents.
c) A network to link computers of a company' s offices in one large city.
d) A network to link all computers in many buildings of a college inside a fence. (4 marks)

iv) Convert from base 2 to decimal the number 101101.01011. Convert the decimal number 268 to octal. Convert the binary number 11101011011 to octal. (4 marks)

v) Design and complete the truth table of the following logic operators NOR and AND. (2 marks)

vi) Define an Operating System (OS). Give two functions of an Operating System. (4 marks).

CGCEB JUNE 2011

1. People who work in front of a computer monitor for long hours usually expose themselves to some health hazards.

(i) Name four health hazards that could directly be linked to prolonged use of computers. (4 marks)

(ii) List and explain four actions you would take to avoid the four different computer related hazards (8 marks)

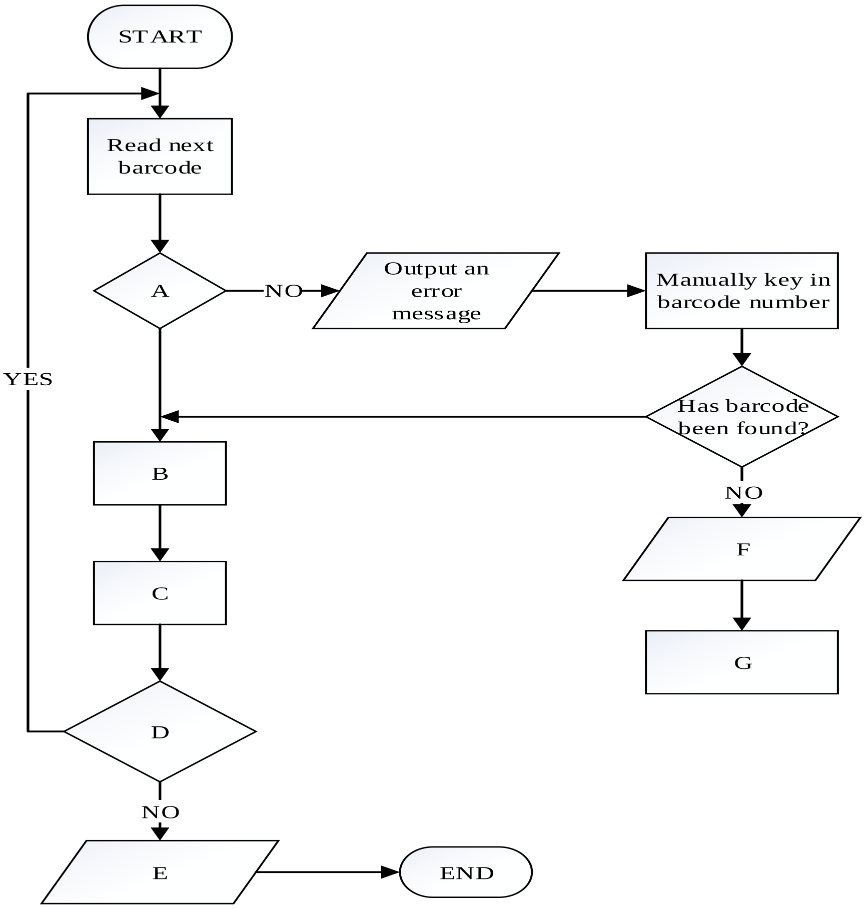
(iii) a) What is a robot? (2 marks)
(b) State three advantages of robots over human workers. (3 marks)

---

2. (i) The following flow chart show how the barcode written on the item is used to find the price, do stock control and produce an itemized bill. Select statements from the list below to match the letters A to G in the flowchart. (You may not draw the flowchart).

List of Statements

1. Any more barcodes to read?
2. Has barcode been found in the file?
3. Look up the price of the item in the file?
4. Output error report.
5. Output itemized bill.
6. Reject item.
7. Update stock file.



(7 marks)

(i) An analyst is hired to carry out a feasibility study.

a) List and describe three areas that the system analyst should report on in the feasibility study. (6 marks)

b) Describe the methods that the system analyst could use in order to collect information about the current being used in the organization (4 marks)

3.(i) Describe the following, stating an example where applicable.

a) Expert systems.

b) Geographical information systems.

c) Simulation systems.

d) Reservation systems (12 marks)

(ii) a) Give two implications of e-commerce to society. (2 marks)

(b) List three reasons why e-commerce may not be a good business strategy in Cameroon. (3 marks)

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4. On line banking has improved banking in most developed countries. It allows customers to access their accounts 24 hours a day without the need to open the door of branches. The central computer runs most of the banking processes.

i) What do the following terms mean?

a) Online

b) Central computer (4 marks)

ii) Give one advantage and disadvantage of online banking on the

a) Bank

b) Customer (4 marks)

iii) Briefly state and describe the main function of each of the following computer hardware components:

a) CPU

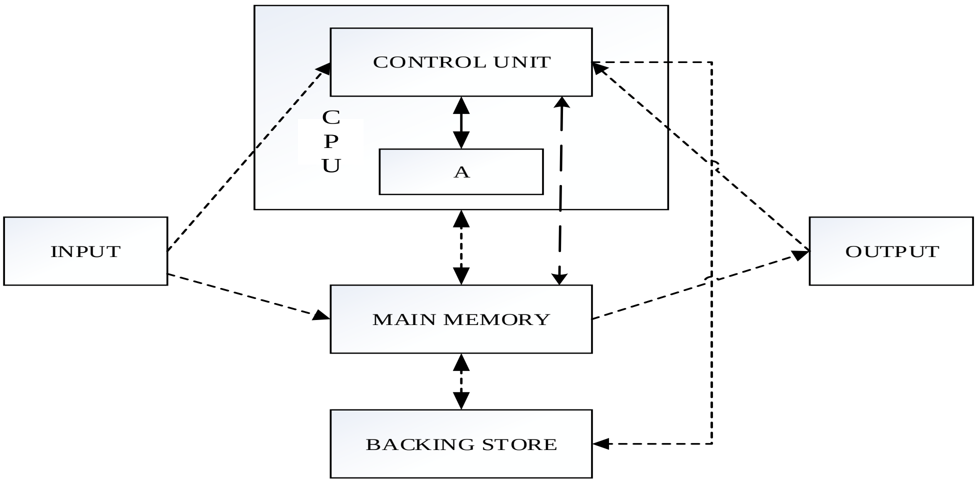
b) RAM (6 marks)

c) Motherboard

iv) Draw the truth table for the following Boolean expressions:

X and (X OR Y) (3 marks)

5. i) The diagram below shows the logical structure of a computer system. It shows the CPU, the main memory, backing store input and output.



a) Give the name of the component labeled A and state its main function. (3 marks)

b) Give another name for the main memory and state its major function. (3 marks)

c) How the seize of the main memory influence the computers memory. (3 marks)

d) Give the components found in the CPU that are not shown in the diagram (2 marks)

(ii) Complete the table by stating the basic principle by which the given printers operate

Ink jet	Sprays ink through tiny nozzels on the paper
Laser	
Dot matrix	

(4marks)

(iii) State two advantages of matric printers (2 marks)

6.(i) What is the main difference between a floppy disk and a compact disk taking into consideration method of storage (3 marks)

(ii) a) What is the storage capacity of standard $3\frac{1}{2}$ floppy disk? (1 mark)

b) How many floppy disks can contain the same amount of information in a standard 750 MB CD? (3 marks)

(iii) Define the following disc terminologies

a) Tracks

b) Sectors (4 marks)

iv) Why is data storage on a hard disk organised in cylinders? (2 marks)

v) Why should a hard disk be defragmented regularly? (2 marks)

vi) Why is it necessary to format a magnetic disk before it can be used? (2 marks)

7. (i) In a school, teacher-student after school communication is by wireless network of laptop computers.

   a) State two advantages for teachers using this system rather than desktop computers located in a computer laboratory. (4 marks)
   b) Give two disadvantages of using lap top computers rather than desktop computers. (2 marks)

(ii) A university provides online training courses.

   a) Give two uses of each of the following to help the university run these courses
      - Spreadsheet package
      - Database package
      - Desktop publishing (6 marks)
   b) A leaflet designed using a word processing software to advertise a course is currently too big to fit on a single printed page. State how you will use three features of word processing software to alter the design so that it can fit on one page. (3 marks)
   c) Give two disadvantages of a database package over a spreadsheet to manage school information. (2 marks)

8.(i) a) What is SDLC? (1 marks)

b) List 4 phases in the SDLC. (2 marks)

c) Choose two phrases from (b) above and state 2 activities for each phase. (4 marks)

d) Describe two methods by which we can implement a completed computer system. (4 marks)

(ii) Explain each of the following project management technology

   a) Project
   b) Critical path
   c) Task (6 marks)

9.(i) Define computer network. (2 marks)

(ii) Distinguish between computer network topology and computer network configuration. (2 marks)

(iii) Name and describe one network configuration. (3 marks)

(iv) With the help of annotated diagrams, name and describe two computer network topologies. (4 marks)

(v) Two types of network connecting media are cables and wireless standards. Name two types of network cables and two wireless network standards. (4 marks)

(vi) Give the main difference between a hub and a switch. (2 marks)

CGCEB JUNE 2012

1.(i) Expand the following acronyms giving explanations in each case

a) BCD
b) ASCII
c) EBCDIC (3 marks)

(ii) What is a robot? (1 mark)

(iii) Explain two uses of computers in the following organizations:

a) Military
b) Education
c) Hospital
d) Multinational corporation
e) Manufacturing industry (10 marks)

(iv) a) Convert the decimal number 120 to an octal number
(b) Convert the binary number 101101001 to an octal number (4 marks)

(v) Design and complete the truth tables of the following logic operators OR and NAND. (2marks)

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2. (i) Give three reasons why data misuse is more easily carried out in a computer system than in a manual system. (3 marks)

(ii) (a) What is a computer virus? (2 marks)
(b) State two actions of a computer that may suggest the presence of any virus in it. (2 marks)
(c) Write down four ways in which you can prevent a computer virus infecting your computer. (4 marks)

(iii) What aspect of computer security does each of the following describe?

(a) Prevent access to unauthorised computers(persons).
(b) Detect keystrokes logging or unauthorised data transmission.
(c) Used to identify the user to a computer system.
(d) Used for security and changed regularly.
(e) Restrict access to certain users.
(f) Data may be stolen but cannot be read. (6 marks)

(v) State and briefly describe one other security method to protect the data of an organization. (3 marks)

3(i) (a) Name and briefly describe three internal threats to ICT systems. (6 marks)
(b) Name and briefly describe two external threats of an ICT system. (4 marks)
(c) Describe three measures you will take to protect your ICT system from illegal access. (3 marks)

(ii) (a) Explain what is meant by:

- File name
- File compression
- File Allocation Table (FAT). (3 marks)

(b) Give two reasons why it is necessary to defragment a hard disk. (2 marks)

(c) The file compression ratio of a disk compression utility is set at 15:1. If the content of the hard disk is 28 GB before compression, what will it be after compressing the data with this compression utility? Give your answers in GB and MB. (2 marks)

4(i) (a) What is batch processing? (2 marks)

(b) How is a batch processing system different from real-time processing system. (1 mark)

(ii) (a) Which two of the following systems are batch processing systems

- Reservation systems
- Payroll
- Billings

Explain your choice of answers. (4 marks)

(b) Give three ways in which office staff will be affected by introduction of a computer system. (3 marks)

(iii) (a) Explain the following terms: Modelling and simulation. (5 marks)

(b) Describe situation which can be modelled and simulated. (5 marks)

5. (i) Computer users with different disabilities require special hardware and software. Complete the table below stating in each case, special hardware and/or software for people with the given disabilities.

(5 marks)

Disabilities	**Hardware/software**
Limited mobility	
Armless	
Slow typist	
Blindness	

(ii) (a) What is data capture? (2 marks)

(b) Give three examples of automatic data capture methods, explaining how each method is carried out. (4 marks)

(iii) (a) What do you understand by intranet and extranet. (3 marks)

(b) List three special features of the networks mentioned in (a) above. (3 marks)

(c) How useful are these networks to an organisation? (3 marks)

6.(i) Define each of the following terms

a) Telecommuting
b) Videoconferencing
c) Expert system
d) Loader (4 marks)

(ii) What is system software? (2 marks)

Name and describe four categories of system software and give an example for any two. (6 marks)

(iii) Fully expand each of the following acronyms giving a brief explanation of its use in each case

a) GIS
b) HIS
c) EIS
d) LIS (4 marks)

(iii) What is Management Information System (MIS). (1 mark)

(iv) Reports are very essential for managers who use them to make good decisions. Name and briefly explain three types of MIS reports. (3 marks)

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7. A payroll system has just been created for an agricultural firm of 50 workers.

i) Describe three main steps that may be taken to implement the system. (3 marks)
ii) Describe two verification methods that the firm could use when entering data into the system. (4 marks)
iii) Describe three system input controls using specific examples. (6 marks)
iv) Describe two measures taken by the organization to ensure that data is not accidentally lost. (2 marks)
v) Describe how, upon installation, the system can be tested. (5 marks)

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8. A school has a manual library system which is run using the following rules:

- Books are grouped according to subjects in shelves.
- Books have codes on them.
- Students have access to the library.
- Each student has a school ID card.
- The record of books borrowed by students is stored on cards which are kept in the library.

i) Give six data structures (fields and data types) of the details found in a borrower's card. Present your answer in a tabular form. (6 marks)

ii) State and explain three ways of collecting information about the current system. (6 marks)

iii) State four items of information that should be part of the design of the computer system. (4 marks)

iv) Design a suitable output format for displaying the details of a borrower. You may annotate your design to make it clear. (4 marks)

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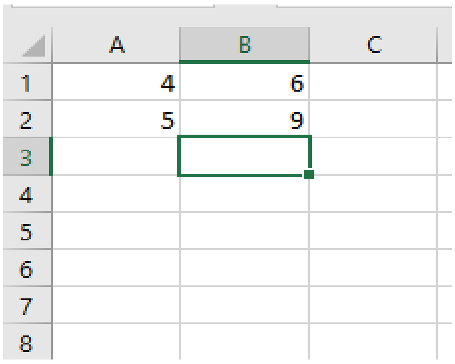
9. The determinant (det) of a 2x2 matrix

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

Is given by det = ad - bc, where $a \cdot d \equiv a \times d$

The table below shows the values of a 2x2 matrix entered in a spreadsheet



	A	B	C
1	4	6	
2	5	9	
3			
4			
5			
6			
7			
8			

Write down the formula you will use to calculate the determinant of the matrix whose entries are in the table. (2 marks)

i) Rewrite the equivalence of the formula above using a spreadsheet function, such as MDETERM in excel, which computes the determinant for any m *x* n array, or otherwise. (2 marks)

ii) Write a program in a stated programming language that reveals inputs of four integers, a, b, c and d, and displays the determinant of the matrix obtained from them as given above. (8 marks)

iii) (a) What is pseudocode? Give two rules for writing pseudocodes. (4 marks)
(b) What is the difference between pseudocodes and source codes? (2 marks)
(c) Give the importance of pseudocodes. (2 marks)

CGCEB JUNE 2013

1. (i) Explain, using examples, the following computer terms.

(a) Data verification
(b) Simulation
(c) Handshaking
(d) video conferencing
(e) Batch processing (10 marks)

(ii) (a) Give two examples of computer crimes. (2 marks)
(b) Give two methods of preventing the state crimes in (a) above (2 marks)

(iii) E-commerce is carried out online. State three possible effects on society if e-commerce increases greatly. (3 marks)

2. (i) State three (3) tasks to perform in the design stage of the development of a new computer system. (3 marks)

(ii) A national bank has changed from a manual filling system to a computer-based system.

(a) State two benefits to the bank for the change. (2 marks)
(b) State two effects on the staff due to the introduction of a computer-based system(2marks)
(c) Give two reasons why the bank would prefer a parallel conversion to the new system (2 marks)
(d) Give two examples where parallel conversion would not be suitable (2 marks)

(iii) Virtual reality is a 3-Dimensional world created by the computer in which the user is part of.

(a) Give two examples of the special hardware needed to interact in a virtual reality. (2 marks)
(b) Give two advantages of using virtual reality (2 marks)
(c) Give an example of an application which uses virtual reality. (2marks

3. (i) There are two different kinds of graphics stored in a computer. Bit-mapped and vector-based graphics. Explain the meaning of bit-mapped graphics and vector-based graphics, giving one file format (extension) used for each. (6 marks)

(ii) Give three advantages of vector-based graphics over bit-mapped graphics. (3 marks)

(iii) Differentiate between data integrity and data security. (2 marks)

(iv) Name and explain three measures you should use to ensure data integrity and three measures to ensure data security. (6 marks)

4. (i) What is meant by pseudocode?

(ii) Explain the following algorithm development concepts:

(a) Stepwise refinement
(b) Top-down design (4 marks)

(iii) Briefly define and say what each of the following programming tools are used for:

(a) Compiler
(b) Interpreter (2 marks)

(iv) Give the structure for the following loop constructs. Your structure should indicate the loop (or test) condition and the loop body (or statement). (The structure of a choice construct is shown below as an example). Indicate for (a) and for (b) the loops condition under which the loop would continue to iterate.

(a) Repeat-until (or do-while)
(b) While
(c) For (3 marks)

Example:

```
IF condition THEN
   Statement
ELSE
   Statement
```

---

5. (i) (a) Draw a block diagram that shows how input, process, main memory, output and storage relate in a computer. (5 marks)

(b) Select any **TWO** blocks of your choice from (a) and name a device for each (2marks)

(ii) Using the block diagram, give the definition of a computer (2 marks)
(iii) Name the two blocks involved in the machine cycle. (2 marks)
(iv) State the four stages of the machine cycle (4 marks)
(v) Explain the term volatile memory and give an example. (2 marks)

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6. (i) Describe the main difference between applications software and systems software (4marks)

(ii) Name four types software and give one use for each class. (4 marks)
(iii) Name the type of application software you would use for the following purposes.
(a) To create, edit and format text based documents.
(b) To work with numbers, calculators, charts and graphs.
(c) To organise and access large amounts of information
(d) To produce good news letters and company magazines (4 marks)
(iv) (a) Define the term computer virus and computer anti-virus. (2 marks)
(b) Briefly explain how the following viruses work:
- Trojan horse
- Worm
- Boot sector virus. (3 marks)

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7. (i) Give TWO uses of each of the following information systems. Your answer should include the type of data or information they manage, and also state how useful the information is to the concerned organisation

(a) Patient record system
(b) Payroll system (6 marks)

(ii) State and briefly explain TWO things that determine the design of interfaces for different groups (students, staff, administrators, etc) in a school. (6 marks)

(iii) (a) Convert 4301_8 to binary.
(b) Evaluate 101_2 x 11_2 (5 marks)

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8. (i) (a) Define the term system development life cycle. (2 marks)
(b) List four stages of the SDLC. (4 marks)

(c) For any two of the stages given in (b) above briefly describe the major tasks involved. (4marks)

(ii) (a) What is a programming language?

(b) Give one difference between low level languages and a high level language? (4 marks)

(iii) With respect to programming, explain the following:

(a) Portability

(b) Algorithm

(c) Control Structure. (3 marks)

9. (i) (a) what is internetworking?

Define the term "The internet" (4 marks)

(b) Describe the terms:

- Intranet
- Extranet. (2 marks)

(c) What is a search engine? State one use of search engines. (3 marks)

(ii) Explain what each of the following hardware is used for in a computer network:

(a) Switch (2 marks)

(b) Repeater (2 marks)

(c) Router (2 marks)

(d) Multiplexer and Demultiplexer (2 marks)

CGCEB JUNE 2014

1. (i) Research on Automatic Speech Recognition (ASR) has intensified since the beginning of the 21st century. Emerging technologies are on the way to increase the quality of interaction between the users and the machine.

    (a) What is automated speech recognition? (2 marks)
    (b) State two advantages and limitations of speech recognition. (3 marks)

(ii) Explain briefly the use of the following input technologies and site a situation in which each can be useful.

    (a) Magnetic STRIP (2 marks)
    (b) Magnetic ink character recognition. (2 marks)
    (c) Touchpad (2 marks)

(iii) (a) Difference between data validation and data verification (2 marks)
    (b) Give the meaning of ***proof reading*** and ***double entry*** (2 marks)
    (c) Describe a situation or application that use the double entry method (2 marks)

2. (i) Give the full meaning of the following and state an application for each:

    (a) LIFO (2 marks)
    (b) FIFO (2 marks)

(ii) (a) What is a source code (2 marks)
(b) Give a reason why programming languages are classified as high level languages? (1 mark)
    (c) State two ways in which you can represent an algorithm (2 marks)
    (d) Describe one way in which algorithms can be compared. (2 marks)

(iii) (a) What artificial intelligence in an industry (2 marks)
    (b) What is Computer Aided Design? (4 marks)

Name one professional who uses CAD and describe to what extent it is useful to him. (4 marks)

3) (i) Define the following terms:

    (a) Relation Database. (2 marks)
    (b) Database management systems. (2 marks)
    (c) Redundancy in database. (2 marks)

(ii) Give advantages and disadvantages of a DBMS. (5 marks)

(iii) Propose two domains of application of each of the following systems:

    (a) Geographic Information System. (2 marks)
    (b) Reservation System. (2 marks)
    (c) Expert System. (2 marks)

4) (i) Give the main function of the following hardware in a computer system:

    (a) Video Card (2 marks)
    (b) Ram chip (2 marks)
    (c) Ethernet Card (2 marks)

(ii) Define the following terms:

    (a) Simulation (2 marks)
    (b) Videoconferencing (2 marks)
    (c) File compression. (2 marks)

iii) (a) What is ergonomics? (2 marks)

Give two advices you will give to a typist who is suffering from back pain and eye strain. (2marks)

(b) Give two advantages of LCD monitors over CRT monitors. (2 marks)

5) i) A machine cycle consist of a series of operations performed to run a single program instruction fetch, decode and execute the instruction and return the result to the RAM if necessary.

a) What is the meaning of RAM? Give the main function of the RAM (3 marks)

b) Explain the process of fetch decode and execute in a machine cycle. (3 marks)

(ii) Describe the following

(a) Word size
(b) Byte
(c) ASCII code (6 marks)

(iii) Name five components of the CPU and briefly explain the function of each. (5 marks)

6. (i) Define the following web technologies and give an example of each.

(a) Web page
(b) Search Engines
(c) Browser (6 marks)

(ii) (a) give three impacts of computer virus to an educational institution.

(b) Suggest two methods that can be taken by a school secretary to protect the computer from being infected by computer viruses.

(c) Give two effects of a virus to a computer system. (7 marks)

iii) a) What do you understand by the term multimedia? (1 mark)

b) Give three ways in which the installation of multimedia centers in Cameroon would affect both teachers and students? (3 marks)

7. (i) Define the following terms

(a) Computer Ethics
(b) Hacking
(c) Copyright (3 marks)

(ii) Give the difference between

(a) Copy-paste action and cut-paste action
(b) Word art and Clip art (4 marks)

(iii) Complete the table below by stating the most appropriate type pf software program that can be used for the stated tasks. (4 marks)

	TASK	**Type of software**
a	Conversion of data to charts	
b	Calculation of areas of a figure in which the user supplies the required input and software generates the output.	
c	To present information on the activities of an organization to the board of directors during a seminar.	
d	Create, manipulate and format text, images and tables for publicity.	

(iv) Give the difference between the different pair of transition modes:

(a) Parallel and serial

(b) Simplex and full-duplex

(c) Synchronous and asynchronous (6 marks)

8. (i) (a) What is Pseudocode?

Give importance of Pseudocode in programming (3 marks)

(b) Give three qualities of a good Algorithm (3 marks)

(ii) (a) What is fault tolerance? (2 marks)

(b) What device can be used to amplify signal to cover a long distance? (1 mark)

(c) Complete the table below by giving the reason for each of the aspects of network topology.

	Aspect	Reason
1	Signal coalition is not common in a ring	
2	Mesh offers the greatest fault tolerances	
3	Security is more assured in a star than in a bus.	
4	A ring offers more fault tolerances than star	

(4 marks)

(iii) Give the full meaning of each of the following file formats and state the purpose for which they are used

(a) .PDF

(b) .MPEG (4 marks)

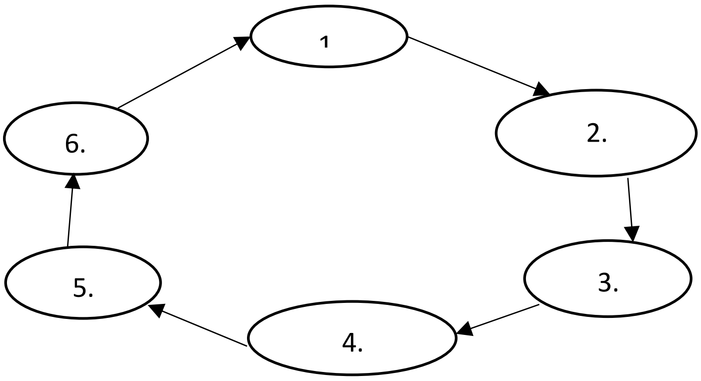
9. (i) Evaluate the following, where binary numbers are absolute values:

(a) 34_{10} to Binary

(b) 101101012_2 - 11111_2

(c) 101101_2 x 101_2 (4 marks)

(ii)



(a) Sketch the diagram above and insert the missing phases (4 marks)

(b) In the analysis of the SDLC, different tools are available to assist the system analyst and end user. Name and explain any two of the tools used. (4 marks)

(iii) Give two reasons why:

(a) The operating system is often installed before any other software.

(b) People prefer working with graphical user interface than command line interface. (4marks)

CGCEB JUNE 2015

1. (i) (a) Explain two reasons why robots are useful to industries. (2marks)
        (b) Describe two reasons that can be taken to secure a banking system (4marks)
    (ii) (a) Describe a DBMS. (2marks)
        (b) What is relational database? (2marks)
        (c) Give two examples of a flat file in databases. (2marks)
    (iii) (a) Explain the term "Programming paradigm". (1mark)
        (b) Define the following programming paradigms
            - Procedural programming
            - Declarative programming (4marks)

---

2. (i) (a) What is network topology? (2marks)
        (b) Explain two considerations in selecting a topology for a school. (4marks)

(ii) (a) What is prototyping? (2marks)
    (b) Give two reasons for prototyping. (2marks)
    (iii) (a) What is a program control structure? (2marks)
        (b) Using either Pascal or C programming language, write out the general form for the following control structures.

- Sequence (1mark)
- FOR statement and (1mark)
- WHILE statement (1mark)

(c) Draw the flowchart symbols for the choice/selection structure. (2marks)

.3.(i) (a) Write out the steps involved in the SDLC in an annotated diagram. (2marks)

(b) Distinguish between piecemeal and direct system implementation methods. 2marks)
(c) Describe one other alternative method of building a system. (2marks)
(ii) (a) State two functions of a project manager in project management. (2marks)
(b) With respect to project management, describe a PERT chart, stating all the elements involved. (2marks)

(c) That is the importance of identifying the critical path of a project. (1mark)
(iii) Discuss TWO possible effects on people who live in some developing countries of having no access or very limited access to ICT. (6marks)

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4. (i) (a) What is a file format? Give one type of file format. (2marks)
(b) Explain one importance of file format. (1mark)
(c) State two reasons why file formats vary. (2marks)
(ii) (a) Systems need protection from hazards e.g natural hazards such as floods and fire, Describe two other hazards that may impede a computer system. (4marks)
(b) Explain three reasons why wireless communication is not preferred by some organizations. (3marks)
(iii) Explain the consequences of network communication without each of the following protocols (relate your answer to the purpose of the protocol).
(a) HTTP.

(b) FTP.

(c) TCP/IP. (3marks)

(iv) State two wireless standards and give an estimation of their area of coverage. (2marks)

5. (i) With regards to the relational database, discuss with the aid of diagrams, the meaning of the following:-

(a) One-to-one relationship. (2marks)

(b) One-to-many relationship. (2marks)

(c) Many-to-one relationship. (2marks)

(ii) With the help of well labeled diagrams, describe three commonly used standard network topologies, giving one advantage and one disadvantage for each case. (6marks)

(iii) Briefly describe each of the following.

(a) E-commerce.

(b) Browser.

(c) E-mail.

(d) Search engine.

(e) DNS. (5marks)

6. (i) List and explain TWO main threats to the safety of data. (4marks)

(ii) How does the Data Protection define the following terms?

(a) Personal data.

(b) Data.

(c) Data Subject. (3marks)

(iii) Differentiate between “synchronous” and “asynchronous” data transmission. (2marks)

(iv) Explain each of the following project management terminologies.

(a) Project.

(b) Critical path.

(c) Gantt chart. (5marks)

(v) Name three important factors to consider when designing a new Computer User Interface. (3marks)

7. (i) Briefly describe the following system software starting the category of each.

(a) Compiler.

(b) Defragmenter.

(c) File compression.

(d) Interpreter. (4marks)

(ii) State FOUR functions of an operating system when managing a computer’s resources. (4marks)

(iii) Define the term interrupt. State one scenario in which an interrupt is used in the management of an operating system. (2marks)

(iv) (a) What is a pseudo-code? (1mark)

(b) Write a pseudo-code that request marks for 5 subjects and calculates the average assuming all subjects have equal coefficient. *Note that average is given by (total marks)/5 in case.* (6marks)

---

8. (i) Briefly describe the following systems as used in ICT, giving an example of each.
   (a) Monitoring system
   (b) Control system (6marks)

   (ii) With respect to computer usage, what is ergonomics? (1mark)

   (iii) Describe two ways that can be taken to prevent:
   (a) Carpal tunnel syndrome (CTS).
   (b) Eye strain. (4marks)

   (iv) Describe how transfer of funds is accomplished in E-commerce. (2marks)

---

9. (i) Define the following terms:
   (a) Process
   (b) Interrupt
   (c) Deadlock (6marks)

   (ii) List two major activities of an operating system with respect to:
   (a) Memory management
   (b) Secondary storage management (4marks)

   (iii) Differentiate between multiprocessing and multiprogramming. (4marks)

   (iv) (a) What is telemedicine? (1mark)

   (b) Name TWO benefits of telemedicine to remote communities in Cameroon.
(2marks)

CGCEB JUNE 2016

1. (i) Explain the following computer terms giving examples where necessary:
    - (a) Video conferencing
    - (b) Stock control system
    - (c) E-learning (6marks)

   (ii) (a) Explain one stage of the machine instruction cycle that takes place in the ALU of the CPU. (2marks)

   (b) Sketch the logic circuit for the logic expression $(\boldsymbol{p}\ AND\ \overline{\boldsymbol{q}})\ OR\ (\overline{\boldsymbol{p}\ AND\ \boldsymbol{q}})$ (3marks)

   (iii) (a) What is software reuse with respect to system development? (2marks)

   (b) State two criteria used to select existing software for reuse. (2marks)

   (c) Explain two situations that may cause organizations to engage in externally developed (outsourcing) software. (2marks)

---

2. (i) (a) Explain the main difference between the peer-to-peer and the client/server networks. (3marks)

   (b) Give two disadvantages of the client/server network. (2marks)

   (ii) (a) What is an Information System? (2marks)

   (b) Explain the term “procedure” as a component of an information system. (1mark)

   (c) In terms of information system describes GIS and LIS. (4marks)

   (iii) (a) What is the main difference between a high level language (HLL) and a low level language (LLL)? (2marks)

   (b) Explain what is meant by machine dependent.
   Which of these languages is machine dependent: HLL or LLL? (2marks)

   (c) Give one example of HLL. (1mark)

---

3. (i) (a) What is SDLC? (1mark)

   (b) Give two advantages of direct system implementation method. (2marks)

   (c) State three activities involved in the design stage of SDLC. (3marks)

   (ii) (a) What is the role of a system analyst in an organization? (2marks)

   (b) Describe two ways by which a system analyst can get information about a system to be developed. (3marks)

   (iii) Discuss with examples three changes in the workplace due to the increased use of ICT. Your answer should refer to the changes for the employees. (6marks)

---

4. (i) (a) What is an operating system? (2marks)

   (b) Explain the role played by the operating system in the given instances
    - Integrating additional hardware to a computer system
    - Managing RAM usage during processing (4marks)

   (ii) (a) What is a computer interface? (1mark)

   (b) Give the characteristics of the Graphical User Interface. (2marks)

   (c) State two advantages of GUI over Command Line. (2marks)

   (iii) Explain the effect and the consequences on computer system in the absence of each of the following:

(a) RAM
(b) Buffers
(c) NIC (3marks)

(iv) (a) What is memory? (1mark)
(b) Describe the purpose of ROM in the computer system. (2marks)

---

5. (i) Structural programming refers to a general methodology of writing good programs.

(a) What is programming? (1mark)
(b) Give 4 properties of a good program. (4marks)

(ii) Describe briefly the following :

(a) Application software (2marks)
(b) Virtual reality (2marks)
(c) Biometrics (2marks)

(iii) Give three advantages of simulation (3marks)

(iv) Write the full meaning of each of the following abbreviations?

(a) ASCII (1mark)
(b) PAN network (1mark)
(c) EPROM (1mark)

---

6. (i) It is usually necessary to compare different implementations of an algorithm to choose an optimal one. This can be done by considering their relative efficiencies.

(a) What is efficiency with regards to algorithm performance? (1mark)
(b) Which two basic resources of a computer can be used to measure the efficiency of an algorithm? (2marks)

(ii) (a) Describe simulation and a situation that can be simulated. (3marks)
(b) Give three advantages of simulation to architects. (3marks)

(iii) Work generally could be classified into operations or project. Although in some cases, they do overlap.

(a) Give any two characteristics common to operations and project. (2marks)
(b) Make a difference between operations and project. (2marks)

(iv) In a multiprogramming and time-sharing environment, several users share the same system simultaneously. This situation can result to various security problems.

(a) What are two such security problems? (2 marks)
(b) Is it possible to ensure the same degree of security in a time-share machine as in a dedicated machine? Explain your answer. (2 marks)

---

7. (i) During the late 1960s and 1970s, there had been an outcry over impending “software crises”. The symptoms of such software crises still exist in present day. List 4 symptoms of software crises. (4marks)

(ii) Explain the following terms:

(a) Parity bit (2marks)
(b) ARPANET (2marks)
(c) Internet standard (2marks)

(iii) (a) What is prototyping? (2marks)

(b) List **three** benefits of prototyping. (3marks)

(iv) Given that a disk has 18 sectors, 80 tracks and a sector capacity of 512bytes. Prove that the storage capacity is 1.44MB. (2marks)

---

8. (i) Explain briefly the meaning of each of the following terms giving examples where necessary.

(a) Automatic Speech Recognition (ASR) (3marks)
(b) HTML (2marks)
(c) Artificial Intelligence (3marks)
(d) Extranet (3marks)
(e) MIS (3marks)

(ii) (a) Explain the meaning of the term "Data Security". (1mark)

(b) Describe how encryption will help to protect information or a message which is sent across a network.
(2marks)

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9. (i) Define the following terms of online Internet services giving TWO advantages and ONE disadvantage of each;

(a) E-Commerce (3marks)
(b) E-Banking (3marks)
(c) E-Health (3marks)

(ii)(a) What is a social network? (2marks)

(b) Outline TWO advantages and ONE limitation of social networking. (3marks)

(iii) Explain the following errors that can arise during programming:

(a) syntax errors
(b) run-time errors
(c) logic errors (3marks)

CGCEB JUNE 2017

1. (i) Briefly describe the following systems as used in ICT, giving an example of each.

    (a) Monitoring system
    (b) Control system (6marks)

   (ii) The manager of a local plantation company complains that the management information system of the company is failing to provide the correct level of information.

    (a) What is management information system? (2marks)
    (b) Give four possible reasons why the system is failing. (4marks)

   (iii) (a) What is digital divide? (2marks)

   (b) Describe three causes of digital divide with respect to global communication. (3marks)

---

2. (i) What is ergonomics with respect to computer usage? (1mark)

   (ii) Describe two ways that can be taken to prevent,

    (a) Repetitive Strain Injury (RSI)
    (b) Eye strain (4marks)

   (iii) Distinguish between the following data transmission modes, giving an example of each.

    (a) Serial and parallel transmissions.
    (b) Broadband and baseband transmissions.
    (c) Synchronous and asynchronous transmissions. (6marks)

   (iv) Describe the following terms as used in Internet communication:

    (a) Chat room.
    (b) Instant messaging.
    (c) Web log (blog). (6marks)

---

3. (i) (a) Differentiate between data and information. (2marks)

    (b) Outline three characteristics that make data reasonable. (3marks)
    (c) Rearrange the following to form the Data Hierarchy System starting with the smallest unit of data to the biggest. Fields, Data warehouse, Folders, Bits, Records, Files, Bytes, Word. (4marks)

   (ii) (a) Briefly explain the term prototyping as used in software development. (2marks)

    (b) Outline four stages involved in prototyping. (4marks)
    (c) State two benefits of prototyping to the end user. (2marks)

---

4. (i) An organization has decided to connect its computers to communicate in a network.

    (a) Give four hardware resources that will be needed in order to have Internet connection. (4marks)
    (b) Describe two responsibilities of a network administrator in this organization. (2marks)

   (ii) (a) Define the programming terms; syntax and semantics. (2marks)

    (b) Describe each of the following: Algorithm, pseudo code and program. (3marks)
    (c) Draw a flowchart to represent the following algorithm

```
Start,
        Enter the radius, R
        Compute Area, $A = \pi * r * r$
        Print "A" and "R",
    Stop.
```

(4marks)

(iii) Give two advantages of data normalization. (2marks)

---

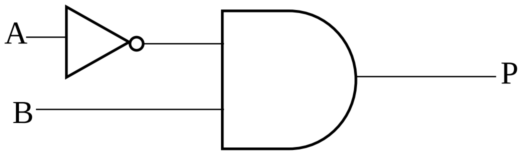
5. (i) What is computer crime? (2marks)

(ii) State two weaknesses of a bank's information system that may expose it to each of the following:-

(a) Unauthorized access to confidential data.

(b) Damage of data. (6marks)

(iii) Study the logic circuit diagram below:



(a) What is the value of P? (2marks)

(b) Draw the truth table of the logic circuit above in (a). (2marks)

(c) Draw the circuit diagram for a NOR gate. (2marks)

(iv) Identify and describe three criteria to be used for the selection of library software. (3marks)

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6. (i) (a) Discuss **two** types of information systems that are useful to top level managers of an organization. (4marks)

(b) Name and explain **two** criteria used to judge the success of an information system in an organization. (4marks)

(ii) (a) What is a project? (2marks)

(b) Give **three** reasons why regular reviews are necessary during all the phases of a project. (3marks)

(iii) Define the following giving one advantage in using them to control a project:

(a) Critical path

(b) Flow chart (4marks)

---

7. (i)(a) In which phase of the SDLC is feasibility studies carried out? (1mark)

(b) Name and explain three types of feasibility assessments carried out in the phase. (3marks)

(c) State and explain three major tasks carried out during the design phase of the SDLC. (3marks)

(ii) What is e-commerce? (3marks)

(iii) Describe how the following activities are accomplished in e-commerce.

(a) Purchasing

(b) Selling

(c) Transfer of funds. (6marks)

(iv) Describe the Boolean data type and explain a situation in which it is used. (2marks)

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8. (i) (a) What is the importance of file format? (1mark)

(b) Draw the table below and classify the following file formats in the right column of file type:

.JPEG, .MDB, .PDF, .XLS, .XML, .WAV, .PNG

Sound	Document	Spreadsheet	Bit-mapped		Database	Hypermedia

(4marks)

(ii) Describe four ways in which e-government could enhance government services in Cameroon. (4marks)

(iii) Describe and give an example of each of the following ICT systems. Your example may be a description of where the system is applicable.

(a) Expert system.

(b) Embedded systems. (4marks)

(iv) Name and explain two data transfer checks use in data communication. (4marks)

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9. (i) (a) List and explain any two types of wireless network standards (4marks)

(b) Explain two disadvantages of wireless network. (2marks)

(c) Discuss how signal strength can be amplified in wireless networks. (2marks)

(ii) (a) Distinguish between the Internet and the Web. (2marks)

(b) Give and explain four ways in which the Internet has affected the society. (4marks)

(iii) If a novel contains 2500 characters how much storage space is required to contain an e-library with two million novels? Give your answer in gigabytes. (3marks)

CGCEB JUNE 2018

1.(i) Define the following ICT terms and for each, give one way that it can be effectively used in today's Cameroon in any domain of your choice. (8 marks)

(a) Teleworking (b) Videoconferencing (c) Office Automation (d) Telemedicine

(ii)(a) What is a robot? (2 marks)

(b) Explain one application of a robot. (1 mark)

(c) Give one disadvantage of a robot (1 mark)

(iii)(a) Convert 580.25_{10} to binary. (2 marks)

(b) Evaluate 111_2 x 101_2 (2 marks)

(c) Evaluate 10110112 + 111112 (1 mark)

2(i)(a) State and Briefly explain THREE computer crimes common in Cameroon of today. (3 marks)

(b) For each of the three crimes named in (a) give ONE method you would use to prevent it. (3 marks)

(ii)(a) Differentiate between interactive processing and Batch Processing. (2 marks)

(b) Describe TWO examples of batch processing. (2 marks)

(iii) Briefly describe the following

(a) Management Information System (MIS) (2 Marks)

(b) E-commerce. (2 marks)

(v) Explain THREE reasons why wireless communication is not preferred by some organizations. (3 marks)

3(i)(a) Differentiate between flat file database and relational database. (2 marks)

(b) Give two advantages of using a relational database over a flat file database (2 marks)

(c) Explain the term "redundancy" as used in database and describe how it can be handled in database design (3 marks)

(ii) Explain the following system terminologies

(a) System testing (2 marks)

(b) Acceptance testing (2 marks)

(c) System Development Life Cycle (1 mark)

(iii) Describe the main function of the following intranet

(a) Firewall (2 marks)

(b) Repeater (1 mark)

(c) Switch (2 marks)

4(i) A company provides network services to its customers in a building occupying three rooms. The network is connected to the internet to bring special e-mail facilities to its customers

(a) Give the name of the device used to connect workstation in a client-server network (1 mark)

(b) Give the name of the device used to link similar or dissimilar network (1 mark)

(c) Explain why a computer could be considered a client and another considered a server in a client/server network (2 marks)

(ii) Describe the functioning of the following data transmission devices

(a) Multiplexing (2 marks)

(b) Half-duplex (2 marks)

(c) Simplex (2 marks)

(iii) Suggest **TWO** methods of protecting user e-mail account from virus attacks (2 marks)

(iv) Wireless networking technology is becoming very popular with the people who access the internet at home. Describe **TWO** advantages and **ONE** disadvantage of using wireless network at home (3 marks)

(v) Describe **TWO** services available on the internet that organizations can use other than e-mail (2marks)

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5 (i) Generally a computer program could be divided into any of the following control structures based on the function to be performed: sequence, Selection/choice, Iteration.

(a) Briefly explain each of the three control structure named above (6 marks)

(b) Study the algorithms A, B and C below

```
A. If you are above 1.95metres tall
     THEN apply for the basketball
     Scholarship
     Else pay for the basketball classes

B. GO TO the box
     Pick two numbers randomly
     Add the two numbers
     Write down the sum
     Stop

C. DO spend the money in your pocket, one hundred francs at a time
     Until you are left with less than one hundred francs.
```

Match the algorithms above to the corresponding control structure named above by completing the

Following table: (3 marks)

Algorithms	**Types of control structure**
A	
B	
C	

(ii) Define the machine cycle and briefly explain each of the stages involved. (4 marks)

(iii) (a) What is e-governance? (1 mark)

(b) Discuss a benefit of e-governance to the Cameroon government with respect to

-Elections

-Taxation

-Education (3 marks)

6(i)(a) What is memory? (1 mark)

(b) State and describe the function of **TWO** memory chips found in a computer (4 marks)

(c) Give **TWO** differences between sequential files and random files (2 marks)

(d) Define each of the following stages in the SDLC and describe its main task

-System analysis (2 marks)

-System construction (2 marks)

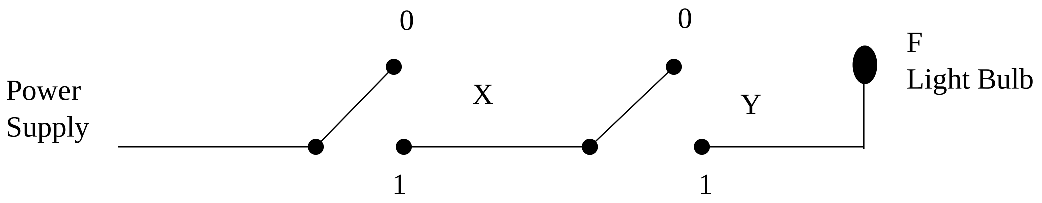
(ii)(a) The content of a memory location reads 10100111. What is the equivalent of this content (2marks)

(b) Convert the hexadecimal Number A7 to binary (2 marks)

(c) Give **TWO** benefits of increasing the memory of a computer (2 marks)

7(i) (a) Describe and operating system and give **TWO** examples (2 marks)
(b) Distinguish between command line and graphical user interface (2 marks)
(c) Explain **FOUR** functions of an operating system (4 marks)
(ii) Describe **TWO** methods than can be used to convert an old information system to a new one. (4 marks)
(iii) (a) What is the difference between data security and data protection? (2 marks)
(b) Name and explain **THREE** methods you could use to secure data in a computer system (3 marks)

8. (i) Explain each of the following management terminologies
(a) Critical path; (2 marks)
(b) Gantt chart; (2 marks)
(c) Project (1 mark)
(ii) The circuit below implements the AND logical operator for the bulb to turn on, i.e. when ths logical value of F equal 1 or when power passes from power supply to bulb

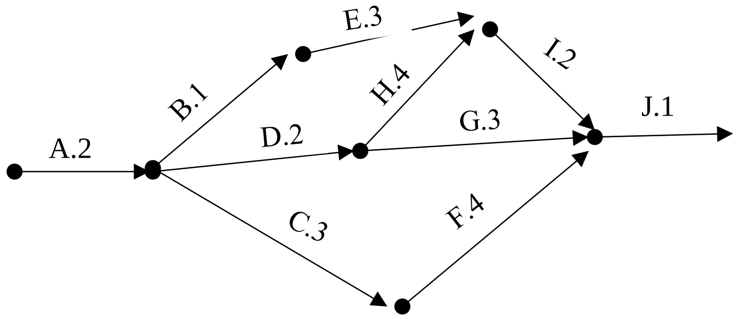


(a) Use figure 1 to complete the table below for the inputs x and y value of 1 for ON and 0 for off (3 marks)

X	Y	F
0	0	
0	1	
1	0	
1	1	

(b) What values will X and Y take for the bulb to light? (2 marks)
(iii) Given two inputs X and Y in a binary logic circuit write down **TWO** expressions of De Morgan's theorem for AND and OR. (3 marks)
(iv) (a) Why is an expert system referred to as knowledge based system? (2 marks)
(b) Give **TWO** main features of an expert system. (2 marks)

9. . (i) Explain the importance of the following types of software and give an example of each:
(a) Device driver; (2 marks)
(b) Utility software; (2 marks)
(c) Language translator. (2 marks)
(ii) The PERT chart for a certain project is given below



(a) State the full meaning of PERT. (1 mark)

(b) Find the critical path showing how it is identified. (2 marks)

(c) How long is the project estimated to last? (1 mark)

(d) Identify **TWO** slack tasks on two separate path and state the slack time of each. (2marks)

(iii) (a) Explain serial data transmission method, and state **TWO** types of serial data transmission methods. (3 marks)

(b) Describe parallel transmission method, and explain a situation where it is used. (2 marks)

CGCEB JUNE 2019

1.(i) A supermarket uses a computerized stock control system to run its warehouse.

(a) State the device that can be used to automatically record the items bought by customers. Explain how the items are prepared for the data capture and how the device is used in the process during sales. (4 marks)

(b) Explain how customers can make payments using credit cards. (2 marks)

(c) Given that the invoice table for some transactions stored in the system is:

Product number	Unit price	Product name
A- 102	400.00	Oil
A- 444	625.00	Mouse
A-303	350.00	Keyboard

Write the SQL statement that will enable you display product number and unit price with a unit price less than 500. (2 marks)

(ii) (a) What is online Banking? (1 mark)

(b) Give TWO advantages of online banking. (2 marks)

(c) Give TWO drawbacks to the bank for introducing online banking. (2 marks)

(iii) A company is planning to have a video-conference in other to advertise its products.

(a) State THREE special hardware that can be used during the conference and give a function or each hardware cited. (3 marks)

(b) Give TWO advantages of video conferencing to the company. (2 marks)

(c) Describe TWO communication aspects that affect the speed of communication. (2 marks)

2.(i)(a) Explain TWO impacts of computer virus to a school information system. (2 marks)

(b) Give TWO ways to protect computers in a school from virus attack. (2 marks)

(c) State two computer health related problems and give a measure to prevent each. (2marks)

(ii) (a) Briefly explain relational database model. (2 marks)

(b) Explain THREE disadvantages of a database management system. (3 marks)

(c) A school intends to create a student record database, state and explain TWO rules from the Data Protection Act you would advise the school to comply with. (2 marks)

(iii) Give ONE advantage and ONE disadvantage of each of the following printers:

(a) Laser printer. (2 marks)

(b) Inkjet printer. (2 marks)

3.(i) (a) State and explain the functions of ONE sub component in the ALU of the CPU.(2marks)

(b) State and explain TWO stages of the instruction cycle carried out in the control unit (2marks)

(ii) An office has four computers. The manager wants to connect the computers in a LAN.

(a) Name a network device which would be possessed by each computer in order to be connected to the network. (1 mark)

(b) Give TWO reasons why the manager will not prefer a wireless technology (2 marks)

(c) State and explain a network topology that is suitable to this office. (2 marks)

(d) Explain TWO security measures that should be put in place in the above office to secure such network from authorized access or misuse. (2 marks)

(iii) Study the algorithm given below

```
Start
    Step 1: Input an integer.
```

```
        Step 2: If p is even
        Step 3: y ←3+p
        Step 4: else
        Step 5: y ←2 + p
        Step 5: print y.
    Stop.
```

(a) What is the objective of this algorithm? (2 marks)

(b) Draw the flowchart of the algorithm. (4 marks)

---

4. (i) Explain the main function of the following in an intranet.

(a) Firewall. (2 marks)

(b) Switch. (2 marks)

(ii) An outsourcing software has been produced for your organization.

(a) Give THREE areas you will use to investigate the effectiveness of the software. (3 marks)

(b) Give TWO importance of outsourcing. (2 marks)

(iii) Give the function of the following in a computer system:

(a) BIOS (2 marks)

(b) Sound Card (2 marks)

(c) Cache Memory (2 marks)

(d) Motherboard (2 marks)

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5. (i) (a) What is recursion? (1 mark)

(b) Give ONE example of a recursive function. (1 mark)

(ii) Almost all organizations have computer-based information system

(a) Give TWO advantages of an information system to a business organization. (2 marks)

(b) Identify and explain the THREE levels of the organizational hierarchy. (3 marks)

(iii) A Software development schedule is shown in the table below

Task	**Description**	**Duration (working days)**	**Predecessor(s)**
A	Requirement Analysis	5	-----
B	System design	15	A
C	Programming	25	B
D	Telecoms	15	B
E	Hardware installations	30	B
F	Integration	10	C, D
G	System Testing	10	E, F
H	Training/ Support	5	G
I	Handover	5	H

(a) Draw the PERT chart for this project. (4 marks)

(b) Determine the critical path of this project. (2 marks)

(c) Give TWO slack tasks, stating their slack times. (2 marks)

(d) Give TWO characteristics you will use to determine that a project was good. (2 marks)

---

6. (i) (a) Define cloud computing and dedicated server. (2 marks)

(b) Give THREE advantages of cloud computing has over dedicated server. (3 marks)

(ii) Explain each of the following computer crimes and give a method to prevent each:

(a) Hacking. (2 marks)

(b) Spam. (2 marks)

(c) Spyware. (2 marks)

(iii) (a) Copy and complete the table below by stating either the software type or give an example. (2 marks)

No	Software Type	Example
1		
2	General Purpose	
3		Recycler
4	Language translator	

(b) Explain the functions of the operating system during managing memory. (4 marks)

7(i) (a) Give TWO effects of increasing the resolution or the number of pixels of a digital camera. (2 marks)

(b) What is automatic input devices and give two examples. (2 marks)

(ii) To send documents, companies sometimes use emails or post office.

(a) Give two advantages of using e-mails over post office. (2 marks)

(b) Give two reasons why post office might be preferable. (2 marks)

(c) Brandon has just bought a laptop computer. Give TWO requirements needed to enable him send and receive c-mails using the laptop. (2 marks)

(iii) (a) Give THREE ways in which a System Analyst can gather information to design a new system for an organization. (3 marks)

(b) One of the phases of SDLC is design. List all the phases of the SDLC in chronological order. (2 marks)

(c) State TWO activities carried out in the design phase of the SDLC (2 marks)

8(i) A digital system is described by the equation $F = \bar{A} \cdot \bar{B} + A \cdot B$

(a) Construct the truth table of the system (2 marks)

(b) Use De Dorgan's theorem to simplify $\overline{\bar{A} \cdot \bar{B} + A \cdot B}$ (2 marks)

(ii) A company uses relational database for its business transactions.

(a) Give TWO advantages of relational database over flat file system. (2 marks)

(b) Give TWO criteria you will use to determine if a table is in the First Normal Form (INF). (2 marks)

(c) Give THREE functions of a Database Administrator to this company. (3 marks)

(iii) (a) What is an algorithm? (1 mark)

(b) Describe ONE way to represent an algorithm (2 marks)

(c) Write an algorithm to calculate and display the sum of three numbers. (3 marks)

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1.(i) Explain the following computer terms giving an example for each.

(a) Automation. (2 marks)

(b) Control system. (2 marks)

(c) Robot. (2 marks)

(ii) Discuss TWO factors that determine the reliability of an information system. (2 marks)

(iii) Identify TWO natural hazards that can affect a computer system and give a measure that can be used to secure the data in each case. (4 marks)

(iv)(a) Distinguish between Simulation and Prototyping? (2 marks)

(b) List the steps used in prototyping. (2 marks)

(c) Give the role of end users feedback in prototyping. (1 mark)

2.(i) One method of data transmission is asynchronous.

(a) Describe asynchronous data transmission giving its disadvantages and advantages. (2 marks)

(b) Describe another method of data transmission (1 mark)

(ii) (a) List and explain THREE components of an Information System (3 marks)

(b) Describe the following Information Systems, stating an appropriate use of each

- GIS
- DSS (4 marks)

(iii) (a) What is a programming paradigm? (1 mark)

(b) Briefly define the following programming paradigms.

- Imperative
- Declarative (2 marks)

(c) Discuss briefly what is meant by high level programming language? (2 marks)

3.(i) (a) Define System Development Life Circle (SDLC) (1 mark)

(b) Name the SIX stages of SDLC and give TWO major tasks of the first three stages (6 marks)

(ii) The web form below is used to collect user input data:

```
<form action =  "user.php"  method =  "post " >
        <p>
                Name :
                <input type = "text" name = "name" />
        <p/>
<form/>
```

(a) Name the scripting language used to process the form above (1 mark)

(b) What is the use of the attributes:

- Action (1 mark)
- Method (1 mark)

(c) Name another method value that can be used in place of “post ". (1 mark)

(iii) (a) Discuss with examples THREE impacts of the use of ICT in healthcare in Cameroon. (3 marks)

(b) Give THREE reasons why the Health Information System is not very effective in Cameroon (3 marks)

---

4. (i) (a) What is system software (1 mark)

(b) Describe the role of any TWO system software. (2 mark)

(c) Explain the ***Round Robin*** and the ***First Come***, ***First Serve*** process management strategies used by the operating system in job scheduling. (3 marks)

(ii) (a) Use a label diagram to describe machine instruction cycle of the computer (2 marks)

(b) Explain the functions of THREE components of the CPU. (3 marks)

(c) Give the main functions of the Random Access Memory RAM (RAM) in the computer system. (1mark)

(iii) Differentiate between ***Interrupt and Polling***. (2 marks)

(iv)(a) What is file extension? (1 mark)

(b) Copy and complete the table below in your answer booklet: (2 mark)

FILE TYPE	**FILE EXTENSION**
Bitmapped graphics	.JPEG
	.PDF
Video	

5.

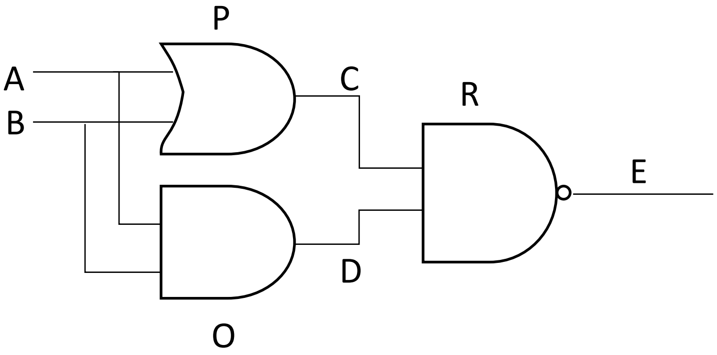

Fig. 5

(i) From the digital circuit above (Fig. 5), identify the logic gates labeled, P and R. (2 marks)

(ii) Write out the Boolean expression of the outputs C, D and E in terms of inputs A and B.(3 marks)

(iii) Construct a truth table for this digital circuit. (4 marks)

(iv) (a) What is a project (2 marks)

(b) Name and explain TWO methods used in controlling projects. (4 marks)

(c) Explain TWO responsibilities of a project manager. (2 marks)

6.(i) CAL is a pedagogic approach gradually being used in Cameroon today.

(a) Define Computer Assisted Learning (CAL) (1 mark)

(b) Briefly discuss TWO course delivery methods used in CAL (2 marks)

(c) Explain One advantage and ONE disadvantage of CAL in Cameroon. (2 marks)

(ii) Define the following Database terms:

(a) Relationship (1 mark)

(b) Attribute (1 mark)

(c) Entry (1 mark)

(d) Redundancy (1 mark)

(iii)(a) What is Normalization in relation to database modeling? (2 marks)

(b) When is a table in a database said to be in First Normal Form? (2 marks)

(iv) In time-sharing multi-programming environment, many users share the same system simultaneously. This situation can result to various security problems.

(a) Identify TWO of such security problems. (2 marks)

(b) Differentiate between multitasking and multiprogramming. (2 marks)

7.(i) Explain briefly the use of the following input technologies and cite a situation in which each can be useful

(a) Bar code reader. (2 marks)

(b) Optical Character recognition. (2 marks)

(c) Automatic speech recognition (2 marks)

(ii) (a) Differentiate between data integrity and data verification. (2 marks)

(b) Name and describe TWO data verification techniques. (2 marks)

(iii) (a) Explain TWO functions of a system analyst. (2 marks)

(b) Explain TWO ways a System Analyst can collect information about a system for analysis. (2 marks)

(iv) (a) Convert the octal number 256 to binary (base 2) (1 mark).

(b) Convert the binary number 11011.11 to decimal (base 10). (2 marks)

8.(i) Explain the following online Electronic Services below giving ONE advantage and ONE disadvantage for each

(a) E-Government (3 marks)

(b) E-Banking (3 marks)

(c) E-Commerce (3 marks)

(ii)(a) What is a social network? Give one example. (2 marks)

(b) Outline ONE advantage and TWO disadvantages of social networking to students in Cameroon. (3 marks)

(iii)(a) What is meant by the term IP address as it relates to the Internet? (1 mark)

(b) briefly explain how protocols send messages across the Internet. (2 marks)

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1.(i)(a) Briefly explain the following giving one practical application of each: PROM, EEPROM, RAM. (6 marks)

(b) As far computers organization is concerned, explain briefly what is meant by address mapping. (1mark)

(c) what is cache memory? (2 marks)

(ii) A student needs to design a logic circuit to model the requirement for membership of a snooker club membership (X) depends on four criteria, as shown below in the table:

Parameter	Description of parameter	Binary value	Condition
A	Over 18	1	True
		0	False
B	Recommended	1	True
		0	False
C	Full-time	1	True
		0	False
D	Retired	1	True
		0	False

Membership is approved (X = 1) if the person

- is over the age of **18 and** has been recommended by a pre-existing member **and**

- **Either** is working full-time or is retired, but not both

(a) Draw a logic circuit to represent the membership requirements. (4 marks)

(b) Draw a truth table for the logic expression: **X = (A**XOR **B)** AND NOT **C** (4marks)

2.(i)(a) What is 2's complement? Why do modern computers use 2's complement? (2 marks)

(b) Represent the decimal number 127 and -128 in 8-bit 2's complement. (4 marks)

(c) Add 127 and -128 in 8-bits 2's complement. What is the denary equivalent of the result obtained? (3 marks)

(ii) A RAM has a capacity of 32k=16

(a) How many memory addresses does this RAM have? (2 marks)

(b) How many address lines will be needed for this RAM? (2 marks)

(iii) State two main differences between RISC and CISC machines. (4 marks)

3. (i) What is a database? (3 marks)

(ii) Define the following terms as far as databases are concern:

(a) Primary key

(b) Candidate key and

(c) Attribute (3 marks)

(iii) The database below is designed to store data about employees of a college

Employee ID	Last Name	First Name	Title	Birth Date	Hire Date
1	Bishop	Franck	Sales representative	08/12/1968	1992
2	Fuller	Emma	Vice president	19/02/1952	1992
3	Buchanan	Judith	Sales representative	30/08/1963	1994
4	King	Praises	Sales manager	09/01/1958	1993
5	peacock	Thelma	Sales representative	02/07/1969	1994

(a) Mindful of how relational database are constructed, give THREE main reasons to explain whether or not the table is in the first normal form (INF). Justify your answer using examples from the data in the table. (8 marks)

(b) State THREE advantages of normalization (3 marks)

4.(i) A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given *n* processes to be scheduled on one processor, how many different schedules are possible? Answer as a formula in term of *n* (3 marks)

(ii) Explain the main differences between preemptive and non-preemptive scheduling strategies (4 marks)

(iii) Jobs P1, P2, P3 need 6,4 and 3 units of execution time respectively. They arrive at time 1,4 and 6 respectively.

(a) Draw a Gantt chart for the jobs if each job is allocated a time quantum of 2 time units at a time and a shortest job first scheduling policy is used. (4 marks)

(b) Calculate the average turnaround time for the processes (4 marks)

(c) Mindful of your result in (b), is the job scheduling in(iii)(a) preemptive? Justify your answer. (2 marks)

---

5. (i) Give the difference between the following pairs of transmission modes

(a) Parallel and serial transmission (2 marks)

(b) synchronous and asynchronous transmission (2 marks)

(c) Half duplex and full duplex

(ii) (a) Is the internet a WAN or a LAN? Explain. Name one common protocol used in LAN. (2 marks)

(b) What is the difference between a network identifier and a host address? (2 marks)

(c) What are the component of the complete internet address of a computer? (2 marks)

(d) Name 3 common ways that malwares can gain access into a computer system. How can one get rid of malware? (5 marks)

---

6. (i) Describe TWO methods that the systems analyst could use in order to collect information about the current system being used in the school. For each method, give a suitable example to illustrate your answer. (6 marks)

(ii) during the process of developing a new system, **changeover** is one of the most important aspects in deploying the new system.

(a) Describe how pilot parallel changeover is done in system development (2 marks)

(b) State one Advantage and Disadvantage of the changeover method (2 marks)

(c) Explain given an example of information contained in **User** and **Technical** documentation. (4 marks)

(iii) Describe the following software testing techniques

(a) Blackbox testing (1 mark)

(b) Whitebox testing (2 marks)

---

7. (i) (a) What is abstraction? (2 marks)

(b) Why is abstraction such a powerful and important concept in computer science? (2 marks)

(c) Explain why a function name is an abstraction. (2 marks)

(ii) Considering language categories like imperatives, functional, logic and object oriented, describe and give and give an example of each. (8 marks)

(iii) Give two advantages and one disadvantage of high-level programming language over low-level ones. (3 marks)

8.(i) The function recur below is a recursive function. Study the function and answer the questions that follow.

```
Function recur(m,n)≡
Start
    if(n=0)
        return m
else
    return recur(n, m mod n)
end
```

(a) Evaluate recur(6,3) and recur(4,6) (4 marks)

(b) Deduce what the function does. (1 mark)

(ii) Given the recursive code fragment below:

```
function sum(n)
        Sum ← 0
        for i ← 1 to n do
                Sum ← sum + i
        endFor
        return sum
    end
```

(a) If the main operation is addition (or subtraction), then how many additions can be made for n=1, 2, 3, 4? (3 marks)

(b) Deduce how many will be done for any n≥1 (3 marks)

(c) Is the algorithm of linear or polynomial complexity? Justify your answer. (2 marks)

(d) What is the algorithm calculating? (1 mark)

(e) Derive a formula for this quantity being calculated in term of n. (3 marks)

SECTION II-A: ANSWERS TO PAPER I

CGCEB JUNE 2013

QN	*ANSWER*	*Comment*
1	D – Videoconferencing	
2	B – Point of Sale System	
3	C – Protect authors of their intellectual Property	
4	C – Unauthorized access to data	
5	B – hardware will be damaged	
6	B- Search engine	
7	B – Information about individuals who are still living	
8	C - Information system management	
9	D – Files of the programs constituting the package have the same extension	
10	C – cache memory	
11	B or C Synchronous or Asynchronous	Synchronous and asynchronous transmission are both forms of serial transmissions. The answer could be more specific if the mode of transfer and reception of the message were emphasized. Although synchronous transmission could be carried out for short distance transmissions.
12	A - Wifi	It ranges from 30m to 40 indoors and over 100m outdoor
13	D – Large Scale Integrated Circuits and Artificial Intelligence	
14	A – Real time processing	This involves the processing of transactions as they are entered
15	A – Multi User	This means that two or more persons can work on it at the same time. The type of OS differs from examples of OS such as Windows XP, 7 etc.
16	A – System Analysis	Read more on chapter 14: SDLC, page 299 of *fundamentals of ICT for Cameroon secondary schools*
17	B – Speech recognition	Speech digitization is the process of converting analog signals(Text, sound, words images) into Digital format(binary code).
18	C – OCR	Optical Character Recognition or Reader
19	A – Two persons input the same data and the software compares	This is a data verification technique. It ensures that the data input is correct and accurate, though it may be costly and time consuming.
20	D – Batch Processing	
21	D – 1.0 x 10^{-12} seconds	Milli = 10^{-3}, Micro = 10^{-6}, Nano = 10^{-9}, Pico = 10^{-12}
22	B – Prototyping	Read more chapter 14, section 14.2.4.2: Prototyping of *Fundamentals of ICT for Cameroon secondary schools*
23	D – Hard disk	Most common secondary storage media of the computer system
24	D – Assembly Language	Assembly language is a low level language consisting of mnemonic codes and symbol addresses corresponding to machine instructions.
25	C – Entity- relationship diagram	Read more chapter 8, section 8.6.10.3 page 133 of *Fundamentals of ICT for Cameroon secondary schools*

26	D – Data integrity	This is all about ensuring that data input is correct and free from errors.
27	D – All of the above	Database manipulation subsystem is used to make queries and design and report forms and views
28	B – a field	Read more on chapter 12, section 12.3.2.2 pg 233 of *Fundamentals of ICT for Cameroon secondary schools*
29	C – Primary key	Read chapter 8, section 8.6.6 pg 128 of *Fundamentals of ICT for Cameroon secondary schools*
30	B – Non procedural	Third Generation Programming languages(3GL) are procedure driven while fourth Generation Languages (4GL) are event driven.
31	A – Arithmetic Logic Unit and Control Unit	Read more chapter 3, section 3.3 of *Fundamentals of ICT for Cameroon secondary schools*
32	A – Memory Address Register	Memory Address Register (MAR) is the CPU register that either stores the memory address from which data will be fetched from the CPU or the address which data will be sent and stored.
33	B – Magnetic	Read more chapter 3, section 3.6.2, Pg 51 of *Fundamentals of ICT for Cameroon secondary schools*
34	D – Defragmentation	
35	C - .cm	
36	B – Browser software	
37	D – Compiling Programs	Compiling programs means program execution, which is a function of the CPU – executing program instructions
38	B – Compiler	Language translator which changes high level language to low level language
39	D – Creating data and file structure	
40	C – Poor system design by the system analyst	
41	B – Pilot	
42	B – The way the organizational data and information are handled	
43	B - Stacks	
44	D – Management information system	
45	B – Flow chart	
46	C - Debugging	
47	B – Source Code	
48	A – VRML	Virtual Reality Modelling Language
49	A – Expert System	
50	C – 0 OR 1 = 1	

CGCEB JUNE 2014

QN	*ANSWER*	*COMMENTS*
1	C – worldwide network of computers that share resources	
2	B – A CPU can process several tasks at a time	
3	D – Distance between connecting devices	
4	C - Server	
5	A - 10	

6	A – Fibre Optic	
7	D – average(A1,A2)	
8	D – Link cells in different tables	This function is found in electronic spreadsheets.
9	C – Presentation software	
10	D – Using the software for unlimited period of time	Site licenses enable the installation of a software on an unlimited number of computers. In little or no situation will a software be given a license for an unlimited period.
11	D – Identifying end-users	
12	D - Ethics	
13	D – Automatically stop the flow of electricity in a computer	
14	A - Compiler	
15	D – Semantics	Syntax describes the rules by which words can be combined into sentences while semantics describes what they mean.
16	D – Bug	
17	B – Procedural Implementation	
18	C – 1	
19	D – Analysis	This report explains what has to be done by identifying the necessary tasks, actions that must be accomplished.
20	D - 00110010	
21	D – It must have a finite number of steps	
22	D – Non Programmers can understand it	
23	A – codes are written in a form that the computer can execute	
24	A - codes are written in a language easily understood by programmers	
25	B – Create relationship between objects	
26	A – Execute	
27	D – Pointer	
28	B – Related records	
29	B – Layout of records in a file	
30	B – Permits direct access of records that are placed randomly.	
31	B – It is made up of one table	
32	A – Design view	
33	C – forms	
34	B – Geographic information systems	
35	A – Primary key	
36	C – the order of field is not important	
37	C – A=0, B=0, C=1	
38	C – $\bar{B}$.A	
39	C – training of users	
40	C – Use the new system only in a department then later extend to others	
41	A – User’s job description	
42	C – Contains the digit 8	
43	No answer	*Repetitive stress injury are computer related diseases caused by the overuse of a particular part of your body*
44	D - Fourth	

45	B – Feasibility assessment
46	D – Documentation
47	A – Provides enough evidence of functionality
48	C – system development life cycle
49	A – A management information system
50	B – Program testing

CGCEB JUNE 2015

QN	*ANSWER*	*COMMENTS*
1	A- Mainframe.	
2	D- Integrated circuits.	
3	B- Embedded system.	
4	D- $\bar{A}+\bar{B}$	
5	C- Executing program instructions.	
6	A- CMOS	Complementary Metal-oxide Semiconductor.
7	C- .PDF	Portable document formats.
8	B- Templates.	
9	C- Validation.	An integrity check which ensures data entered is sensible and readable
10	D- Spreadsheet package.	
11	B- It’s a device independent.	
12	A- Hacking.	
13	D- Bespoke.	
14	C- Enforcing legislation.	
15	A- MIS: Management information system.	
16	C- People, data, machines and procedures. In this case the machine equal hardware plus software.	
17	D- TPS: Transaction processing system.	
18	A- Stack.	
19	C or D -Microseconds-Nanoseconds-Picoseconds.	
20	D- Can hold elements of different types.	
21	D- 1,500,000.	
22	D- Photocopying.	
23	B- Programmers easily write codes using them.	
24	A- Independent of the system.	
25	A- Parallel data transmission.	
26	B- Handshaking.	
27	D- Multiplexing.	
28	C- Boost the strength of signals to cover long distance.	
29	B- Start-stop bits.	
30	A- Email.	
31	A- Mesh.	
32	B- Bridge.	
33	B- Number of users.	
34	D- The modem most be used to connect the laptop to the LAN.	
35	B- SMTP: Simple Mail Transfer Protocol.	
36	A- E-commerce.	Read more on chapter 11 page 209.

37	C- Analysis, design, implementation, support.	
38	B- Analysis phase.	
39	D- Use of comments: This better explains the programmer's intention on using a particular approach in solving a particular problem.	
40	B- They are easily understood by non-programmers.	
41	A- IF-THEN statement.	
42	C- 3, 5.	
43	B- C#	
44	B- Control structure.	
45	D- Its codes are made up of mostly functions.	
46	B- Routines can be tested in isolation before being added to the larger programs.	
47	C- Data flow diagram.	
48	A or B- Slack or floating tasks: they both have the same meaning in project management.	
49	A- Ordered list.	
50	A- We have to normalize the database.	

CGCEB JUNE 2016

QN	*ANSWER*	*COMMENTS*
1	B- Fetch and decode.	
2	C- Registers.	
3	B- Dots per inch.	
4	A- OCR: Optical Character Reader.	
5	A- Data protection act.	
6	D- Full.	
7	C- Decode instructions in a computer.	
8	B- Data verification.	
9	A- A queue of data in a computer for printing.	
10	A- Data Mining	
11	B- A driver.	
12	D- Integrated circuits.	
13	C- Productivity software.	
14	A- Operational day-to-day activities.	
15	B- Executive support system.	
16	A- Batch.	
17	B- Size of the business.	
18	B- Number of bits the CPU can process simultaneously.	
19	D- TCP/IP: Transmission Control Protocol and Internet Protocol.	
20	A- Custom software.	
21	A- B2 and C1.	
22	D- Artificial intelligence.	
23	D- Register.	
24	B- Are not accessible everywhere.	
25	D- Search engine.	
26	A- FTP.	
27	C- Online out of the office.	

28	D- System maintenance and review.
29	B- Training of users.
30	D- Control structure.
31	A- Direct.
32	A- Compiler
33	C- Completion of an important stage of a project.
34	B- Syntax error.
35	C- Browser.
36	C- Foreign key.
37	A- Authentication.
38	B- Defragmenter.
39	A- Use of firewall.
40	C- It is always in text form.
41	B- Serve many people at a time.
42	C- E-commerce.
43	B- Selection.
44	B- Computer aided learning.
45	C- Flow chart.
46	B- Procedural programming.
47	A- Initiation.
48	A- Critical path.
49	D- Multiplexing.
50	A- 24.

CGCEB JUNE 2017

QN	*ANSWER*	*COMMENTS*
1	C – Stock Control System	
2	D – Expert systems	An example is a weather prediction system. Expert system are computer programmes which simulate the judgment and behavior of a human or an organization that has expert knowledge and experience in a particular field.
3	B – CAD	Computer Aided Design
4	B – Exposure of personal data on the internet	The data protection act, aims at protecting the rights of individuals to privacy.
5	B – Sending threats to people over the internet	Such acts are referred to as Cyberbullying or Cyber harassment. To an extend the threats could be considered as an act of terrorism, hence, Cyberterrorism.
6	D – Use of one server in a network.	If the server is attacked data will be lost
7	B – Files to be structured in a particular manner.	
8	C – File type	
9	B – Use of firewalls	
10	C – MS-DOS	Microsoft Disc Operating System
11	B – Database held on a single file	
12	A - Boolean	
13	C – XOR	
14	A – Switch	
15	A – GIS	Geographical Information System
16	A – It is written in a language understood by programmers	

17	D – 01000011	
18	B – Extranet	
19	A – Sort data according to a desired criterion	
20	B – Parity Bit	
21	B – Modular programming	Modular programming is the process of subdividing a computer program into separate sub-programs. A module is a separate Software component. It can be often used in a variety of applications and functions with other components of the system.
22	D – One trillion Bytes	
23	A – 4	
24	A – Stepwise refinement	Stepwise refinement is a way of developing a computer program by first describing general functions, then breaking each function down into details which are refined in successive steps until the whole program is fully defined. Also known as top-down design.
25	C – Hybrid	
26	B – n(n-1)/2	
27	B – Optic fibre	
28	A – Provide access to phone numbers	ISPs are companies which provide Access to the internet.
29	D – Type of browser	
30	B – Search engines	
31	C – the tag <b> is not closed.	
32	C – Increases school attendance through distance learning.	
33	C – Training users	
34	D – IF-THEN statement	
35	B – Random	
36	D – RAM size	
37	B – Size of the monitor	It could be referred to as the resolution of the monitor.
38	B – Compiler	
39	D – Local variable	Local variables are initiated within a limited scope. This means they are declared when a function or subroutine is called and once the function ends, the memory is taken up by the variable is released. This contrasts with global variables which do not release memory.
40	A – Procedural programming	It is a computer programming language that follows, in order, a set of commands for example; Pascal, Basic, C, Fortran
41	C – Lobbying for sponsors	Lobbying is the act of attempting to influence the actions, policies or decisions of officials in their daily life, most often legislators or members of regulatory agencies.
42	B – Strategic Management	
43	D – floating tasks	
44	D – Gantt chart technique	
45	D – Utility software	
46	B – File transfer protocol, FTP	

47	A – ergonomics	
48	D – Teleworking	
49	C – The division by 4 makes the formula wrong	
50	B – CMOS	Complementary Metal Oxide Semiconductor

CGCEB JUNE 2018

QN	*ANSWER*	*COMMENTS*
1	A – Optical Mark Reader	
2	B – Sharing resources	
3	C – Firewalls	
4	B – WAN	Wide Area Network
5	D – The more the users, the more insecure the network is more likely to become.	
6	B – Only computers on the side of the server function	
7	B – The system stop functioning and no file from the server can be retrieved.	
8	A – Configuration Table	
9	B – Videoconferencing	
10	No answer	Command Line Interface is text based, doesn't require a mouse, requires users to have knowledge of commands.
11	A – Keyboard	
12	B – Compressed files	
13	B – Virus	
14	C – DVD	All the devices mentioned are storage devices, but DVD is the only optical storage device.
15	C – Text, sound, animation and video only.	
16	D – Loss of data	
17	D – word processor	
18	A – it is managed by a system analyst	
19	A – Navigation	
20	D – Assembly language	
21	B – 2560	(2.5KB x1024B)
22	B – Hertz	Frequency for example; 2.60GHz
23	C – Feasibility Study, Analysis, design, implementation	
24	A – System analysis	
25	A – Real	A real data type is a data type used in a computer program to represent an approximation of a real number. Because the real numbers are not countable, computers cannot represent them exactly using a finite amount of information.
26	C – Management system	
27	A – Mouse Webcam, MICR	
28	C – Hard disk and floppy disk	
29	D – Input device	
30	A –Communicates messages over the radio, TV and telephone	Communication systems enable people who are working together by enabling the exchange of data and information electronically.
31	D – Loudspeaker, Monitor, Printer	
32	D – Compiler	
33	D – Yahoo	

34	A – Data packet	A data packet is a unit of data made into a single package that travels along a given network path. Whereas IP packet may refer to an Internet protocol, for example; IPv4 packet, IPv6 Packet.
35	A – Volatile	
36	B – It is a private network that functions like the internet	
37	C – Fetch, decode, Execute	
38	D – E-government	
39	A – A, D, F	
40	B – Slack Time	
41	C – Milestone	
42	D – scope	It implies what is intended to be accomplished. In other words, the customers' requirements
43	D – Choice	Selection Control Structure
44	C – Stack	A stack is a linear list in which items are added and removed from the same end (head). This means that the last item to be added will be the first to be removed.
45	A – Coding	
46	A – 11	6>3, Y = 5 x 6/2 = 15 ; P = 15 - 4 = 11
47	B – Do-while	
48	B – They allow the manager to manage the progress of the project.	
49	B – High level language	The compiler converts high level language to low level language
50	C – Object code	Object code is produced when an interpreter or a compiler translates source code into recognizable and executable code.

CGCEB JUNE 2019

QN	***ANSWER***	***COMMENTS***
1	B – Device driver	
2	C – OCR	
3	D – Bus	
4	B – Using LCD monitors	
5	B – Main Memory	
6	A – Be a lag task	
7	D – Prototyping	
8	A – 3E	
9	C – Credit Card	
10	B – Logic Gates	
11	C – Mesh	Hybrid is the combination of mesh and tree topologies. Thus, making Mesh the best choice for this question.
12	B- Data Integrity	Data Encryption is a security measure which simply avoids that data transferred and intercepted can't be understood, it doesn't ensure that the transferred data is error free.
13	A- The DBMS blocks the record to one user	This happens at the particular time, incase both users have same privileges over the record.
14	D – Decode, fetch	
15	B – 8	N<M (5<7) → M = N+3= 8
16	C – Draw up strategies for implementation	
17	A- E-Government	

18	C - Multiplexer	
19	C – Loop	
20	B – Simulation	
21	A – Application Software	
22	B – Instruction Set	
23	A – Direct	
24	B – Half-Duplex mode	
25	D – Compiler	
26	B – Simulation	
27	C – HTTP	
28	A – Compression Software	
29	A - Debugging	
30	C – Video controller	
31	C - John is a <i>boy</i>	
32	A – touchpad	
33	A - $\bar{A} \cdot B$	
34	C – The bandwidth is low	
35	C - Videoconferencing	
36	A – ISP	Internet Service Provider
37	D – Defragmenter	
38	B – SDLC	
39	D – Router	
40	B – Authentication	
41	B - 11111	
42	B – Geographic information System	
43	C – Protocols	
44	B – SQL	
45	B – Firewall	
46	A – Compilation	
47	B – The code executes faster	
48	D – URL	Uniform Resource Locator
49	A – Hacking	
50	C – Batch system	

CGCEB JUNE 2020

QN	*ANSWER*	*COMMENTS*
1	C – Increasing the number of running processes	
2	A- Integrated Circuits	
3	C – Make an extra copy of the data to an external storage device	
4	D – $10DC_{16}$	
5	D – Provision of Internet and Multimedia facility tools	
6	D – Virtual private Network	
7	C – Each record in a table contains unrelated collections of fields	
8	C – The speed of uploading/downloading on an online server.	
9	C – Produce reports from transaction data needed by managers to run the business.	
10	B – Technology that enables the delivery of telephone conversations over the internet.	
11	D – Special-purpose software	
12	A – Files may share the same name or the same extension in the same location	

13	C – Improve the quality of data entered for a specific purpose.	
14	A – To keep system programmers employed	
15	D – It gives the user the right to install and run the software on a specified number of computers.	
16	C – Yahoo	
17	A – Synchronous	
18	B – Real time processing	
19	C – GIS	
20	C – Business – to- customer (B2C)	
21	C – Open	
22	No answer	Digital computers are way better than analog computers in all categories suggested
23	C – Bus	
24	A – Arrays	
25	B – Queue	
26	B – locality	
27	B – Allows flexible working hours	
28	D – Gantt chart	
29	D – Piecemeal conversion	
30	B – Shoulder surfing	
31	A – 00001101	
32	A – Access rights	
33	D – Stock Control Software	
34	C – There is facial contact between buyer and seller	
35	A – Acceptance test	
36	B – Decision Support System	
37	C – SMTP	Simple Mail transfer Protocol
38	A – Assembly language	
39	B – Operating System software	
40	D – Fetch, decode, execute	
41	D – $\overline{A}.\overline{B}$	
42	B – Planning and tasks management	
43	C – worms	
44	B – Switch	
45	A - Template	
46	D – E-trading	
47	A – The database blocks the record to one user	
48	A – Quality does not change during resizing	
49	C – Optic Fibre	
50	C- Functional Programming	

SECTION II-B: ANSWERS TO PAPER II

CGCEB June 2010

1(i)(a) **Automation**: It is the creation of technology and its application in order to control and monitor the production and delivery of various goods and services in a factory or office using machines or computers. Thus, reducing the amount of work done by humans and the time taken to do the work. It is being used in a number of areas such as manufacturing, transport, defense and lately, information technology.

b) **HTML**: HTML stands for HyperText Markup Language. It is the authoring language that describes how a webpage should be displayed by a web browser. *Hypertext* means that it provides ways for representing information with links or connection to other information. These links are called Hypertext links. Markup means that it provides ways to indicate the underlining, italics, paragraph, breaks, section headings etc in text.

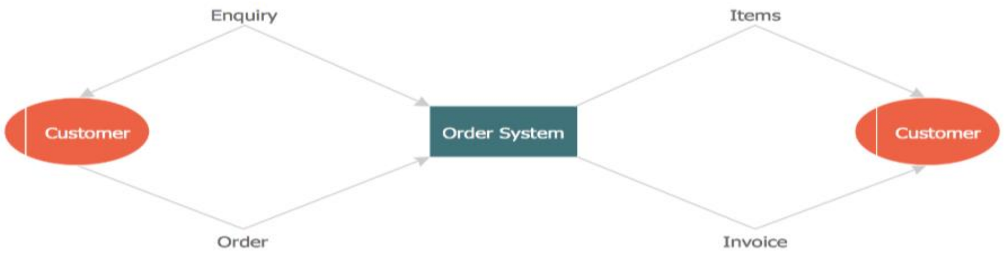
(Authoring: The design and production of computer programs and websites, using special software)

c) **DBMS:** stands for Database Management System. is a collection of programs that enables you to store, modify, and extract information from a database. There are many different types of database management systems, ranging from small systems that run on personal computers to huge systems that run on mainframes. Some examples of database applications are; computerized library systems, automated teller machines, flight reservation systems.

d) **Data Flow diagrams (DFD):**

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated.

Below is an example of a DFD for a shop, where the diagram shows how a client interacts with an order system.



e) **Data Protection**: Data protection is the process of safeguarding important information from corruption, compromise or loss. The importance of data protection increases as the amount of data created and stored continues to grow at unprecedented rates. It could also be referred to as data privacy or information privacy.

ii)(a) **Data:** the quantities, characters, or symbols on which operations are performed by a computer, which may be stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media.

(b) **Data Subject**: A data subject is any person whose personal data is being collected, held or processed.

(c) **Personal data**: It is ant data why can identify and individual and allow an opinion to be expressed about them. It does not have to be sensitive information, it can be as little as a name and address.

2(i)(a) **Teleworking**: The prefix Tele- simply means distant, especially transmission over a long distance. Thus, Teleworking doing office work at home while maintaining contact with colleagues, customers, or a central office, using communication tools, such as such as phone, fax, modem, Internet teleconferencing, e-mail or IM, from a remote location.

b) *Advantages of teleworking to a teacher*

Although teaching is encouraged to be done in classrooms and for the teacher and student to have a better interpersonal relationship, there exists some benefits of teleworking to a teacher.

- *Student assessment*: The assessments can be done either by assignments or evaluations to be submitted to the teacher by the student via computer systems and the internet.

- *Student record*: the teacher can update the students' performances remotely using their computer systems. In this case, they will process the results at home and input them to the school's database system

- *Teaching:* There are so many possibilities for the teacher to carry out his duty from home, either by distance learning or Computer Assisted learning platforms. The teacher could create a forums through which he transmits his lectures and get feedback from the students based on their comprehension of the subject.

c) *Importance of Teleworking to a school*

- *Student record information:* Teachers will be able to process students' performances and update the school's central database. This will enable the school process students' files especially the report card on time. Through the school's systems for instance a website, students could submit the information online for processing. This could help reduce queues observed during student admissions, registration etc.

- *Timely updates about recent events in schools:* the school always have activities which it carries which will be of interest to students, parents and staff. Thus, their systems can enable the latter to be notified against upcoming activities of interest to them. This will reduce cost of transportation and propagation of unverified information.

ii)(a) Star topology; Bus topology, ring topology

(b) – Ease communication between students in the network.

- Sharing of resources such as printers, scanners. The school can't afford to buy a named number of resources, thus, connecting the computers on a network, permits the students to manage the limited resources available in school.

c) – *Access control:* The file server can restrict access to some files, directories, drives etc to some users of the network and limit others.

- *Intrusion detection*: The server can detect and remove computers which are not identified(intruders) on the network. Intruders could be a threat to the security of the computer system.

- *Central database*: All files processed on computers connected to the server are backed up for storage on the file server.

d)(i) WAN = Wide Area Network

It is a network category which spans towns, cities, countries and continents. It is the largest network type. Example of the WAN is the Internet.

(ii) - *Collaboration*: Information is distributed among the students as according to requirement and it can be accessed by the authorized users, resulting in enhanced teamwork.

- *Cost Effective*: Students can see the data and other documents using browser rather than printing them and distributing duplicate copies among the students, which certainly decreases the cost.

- *Time Saving*: Information on Intranet is shared in real time.

3(i)(a) **Ergonomics**: Ergonomics refers to the application of scientific knowledge to the workplace in an effort to improve the well-being and efficiency of workers. Simply put, it is the study of human factors related to things people use. These factors include workstation layout, sitting posture, lighting, viewing distance etc.

b) - *Computer Vision Syndrome*: This comprises of problems related to seeing correctly like visual fatigue, dry itchy and sore eyes, blurred or double vision, burning watery eyes and loss of color in affected regions. To avoid eyestrain, take the following precautions:

- Exercise your eyes periodically focusing on objects at different distances
- Blink regularly
- Position the monitor to avoid glare

- *Repetitive Strain Injury:* RSI is a health problem resulting from overusing a part of the body to perform a repetitive task, like typing and clicking, thereby causing trauma to that part. To avoid RSI;

- Take regular breaks after working for long hours
- Apply Ice massage on the injured parts of the body
- Stretch and strengthen your arms after long hours of work

- *Neck pain and Back pain*: These are problems which results from poorly sitting position, poor chairs, wrong position of monitor, working for long hours without rest, etc. In order to remedy such problems, we should;

- Observe some rest after sitting for long hours in front of the computer.
- Use an adjustable chair with back rest if possible
- The monitor should be set so that your neck will be straight

ii)(a) *In this question, we are asked to explain the USE and FUNCTIONING of the following: So emphases will be laid on the importance and mode of operation of the technology.*

- Bar Code Readers:

Use:

- A bar code is a set of lines of different thicknesses that represent a number
- Bar Code Readers are used to input data from bar codes.
- Most products in shops have bar codes on them
- Bar code readers work by shining a beam of light on the lines that make up the bar code and detecting the amount of light that is reflected back
- Bar codes represent a code number for a product

Mode of Operation: The sensor in the barcode scanner(reader) detects the reflected light from the illumination system (red light) and generates an analog signal that is sent to the decoder. The decoder interprets that signal, validates the barcode using the check digit and converts it to text.

- Optical Mark recognition (OMR):

Use:

- OMR uses an input device called an optical mark reader to detect marks made in certain places on specially printed forms.
- A fast input method, used where large amounts of data need to be input quickly.
- Used to input data from things like answer sheets for multiple choice exams and registration forms in schools
- Also National Lottery forms

Mode of Operation:

The OMR device uses a dedicated scanner that focuses a beam of light onto the concerned area. Since black spots reflect lesser light than white areas, the scanner detects them. Then, a digital blue print of the paper is prepared by different computing algorithms.

Nowadays, we also use Digital Image Processing techniques for OMR. In that case an image of the page is taken, algorithms (mainly differential techniques) are run to extract the required contrasts (for e.g. black bubbles or horizontal lines) and finally computed further.

b) Two main functions of the following devices:
- Video Card:
i. It renders images, animations and video for the computer's screen.
ii. It include a processing unit, memory, a cooling mechanism and connections to a display device.
- Sound Card
i. Allows the computer to send audio information to an audio device, like speakers, a pair of headphones,
ii. translates audio from digital code to the sound waves as needed

- Network Interface card
i. It is an expansion **card** that enables a computer to connect to a network; such as a home network, or the Internet using an Ethernet cable with an RJ-45 connector.
ii. It translates computer data into electrical signals it sends through the **network**; the signals are compatible with the **network** so computers can reliably exchange information.

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4)(i)(a) *See answer to Question 1(ii)(a) June 2010.*
(b) *In this question we are asked to list the **threats** to the safety of data, this simply means we should state those things which could compromise or disrupt data stored on a computer system. It is advisable for students to state computer crimes which has to do with illegal access and use of computer data. Examples; Malware attacks, Hacking (unauthorized access and Unauthorized Use)*

Threats:
i) **Malware Attacks**: Malware (malicious software) is any software that could harm a computer system, interfere with a user's data, or make the computer to perform actions without the owner's knowledge or permission. Examples are virus, worms, Trojan horse, spyware and logic bombs.
ii) **Unauthorized access**: Gaining access to systems you have no permission to access. This is when someone gains access to a website, program, server, service, or other system using someone else's account or other methods. For example, if someone kept guessing a password or username for an account that was not theirs until they gained access it is considered to be unauthorized.

Measures:
i) Install antivirus software and update it regularly.
ii) Install intrusion detection systems to help detect any unauthorized access to the system.
iii) Install firewalls to prevent unauthorized access to local networks.
iv) Encrypt confidential data stored in computers or transmitted over communication networks.

(ii)(a) *Implementation of a system is the conversion from the use of the present (old) system to the operation of the new system. This involves the installation of new system, loading of new system, education and training of users of the system. Read more on Chapter 14, section 14.2.6 in Fundamentals of ICT for Cameroon Secondary schools*
- Parallel Running:
The old and new systems are operated alongside each other (in parallel) until new system is proven capable.
- Direct Changeover:
The old system is completely replaced by the new one.
- Phased Implementation:

The new system is installed in phases (stages or steps) gradually replacing parts of the old system until eventually, the new system takes over.

(b) *Advantages and disadvantages of system implementation methods*

- **Parallel Running**:

o It is advantageous in that, if the new system fails, the old system will act as a back-up. Also, the outputs from the old and new systems can be compared to check that the new system is running correctly.

o Its disadvantage is that, entering data into two systems, and running two systems together, takes a lot of extra time and effort.

- **Direct Changeover:**

o Its advantage is that, it is cost effective; there is need to start working with the new system to enhance productivity and optimize the performance of the major processes under study.

o Its disadvantage is that, if the new system fails, there is no back-up system, so data can be lost

- **Phased Implementation:**

o Its advantage is that, it allows users to gradually get used to the new system, and training of staff can be done in stages.

o Its disadvantage is that, if a part of the new system fails, there is no back-up system, so data can be lost.

5(i) **On-line environment (real time environment)**: In real time processing, time is the key parameter. This processing method is used when it is important that the input request is dealt with quickly so as to be able to control an output properly. In industrial process control systems, real time computers have to collect data about the production process and use it to control machines in the factory. For example; traffic light systems

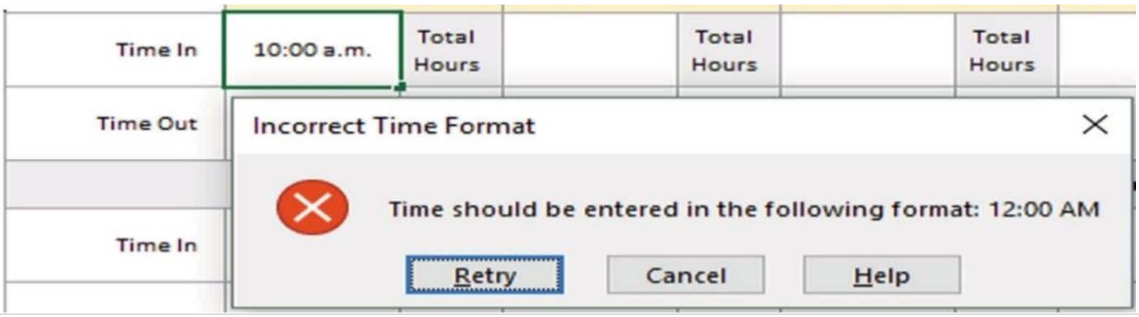
Batch environment: With batch processing, inputs are not processed until a certain number have occurred or a set time has passed. Batch processing is usually fully automatic unlike real time which is interactive. For example; AES SONEL billing system.

(ii) Automated input controls has a purpose to ensure the completeness and accuracy of the records and the validity of the entries made therein.

(iii) ***Preventive controls*** *are designed to prevent unauthorized or invalid data entries.* ***Detective controls*** *help identify unauthorized or invalid entries****.*** ***Corrective controls*** *assist in recovering from unwanted occurrences.*

Preventive Controls	Detective Controls	Corrective Controls
Range Checks	Error Reporting	Validity checks
Limit checks	Duplication Checks	
Range checks		
Completeness check		
Check digits		

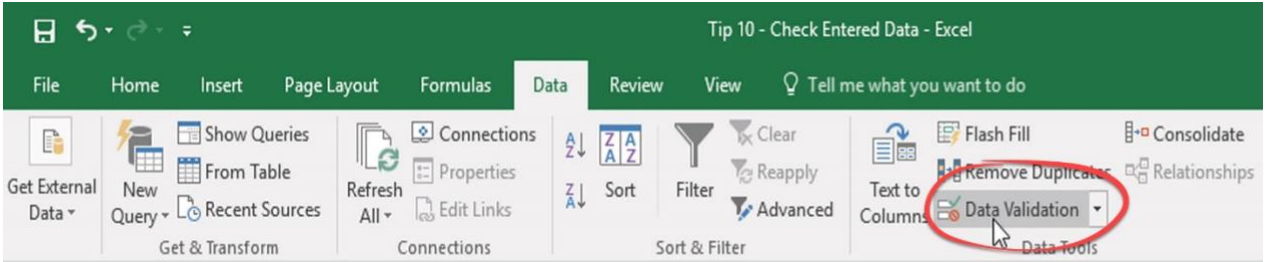
iv) *Excel allows you to set certain cells to accept only a certain data format that you specify. You can prompt the user with guidelines about the proper way to enter their data. You can even specify that data*

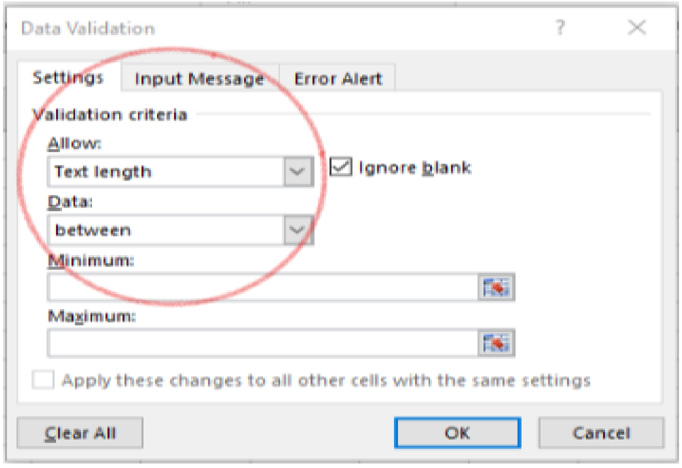


Incorrect Time Format

Time should be entered in the following format: 12:00 AM *must fall in a certain data range if you wish. When data entered does not match your specifications, Excel will display an Error Alert that will prompt the user to try again with the correct format*

a) Select the cell or cells that you wish to check during entry.
b) On the **Data** tab, in the **Data Tools** group, click **Data Validation** to open the **Data Validation** dialog box.





Allow: Text length

☑ Ignore blank

Data: between

Minimum:

Maximum:

☐ Apply these changes to all other cells with the same settings

For Name

On the **Settings** tab, specify the criteria you wish the entered data to meet:

- Choose the **Text Length** data type in the **Allow** dropdown menu.
- Choose **between** from the **Data:** dropdown menu**.**
- Set your range of acceptable minimum and maximum characters**.**

For Sex

On the **Settings** tab, specify the criteria you wish the entered data to meet:

- Choose the **List** data type in the **Allow** dropdown menu.

Type the various types of Genres (sex) i.e Male, Female separated with a comma (,)

For Date

On the **Settings** tab, specify the criteria you wish the entered data to meet:

- Choose the **Date** data type in the **Allow** dropdown menu.
- Choose **between** from the **Data:** dropdown menu**.**
- Set your range of acceptable minimum and maximum dates**.**

For Marks

On the **Settings** tab, specify the criteria you wish the entered data to meet:

- Choose the **Decimal** data type in the **Allow** dropdown menu.
- Choose **between** from the **Data:** dropdown menu**.**
- Set your range of acceptable minimum and maximum numbers(marks)**.**

6(i)(a) **Expert Systems** are programs that imitate the intelligence of human experts in a specific field of knowledge. It is a system is a computer program that simulates the judgement and behaviour of humans or organisations that has expert knowledge and experience in a particular field. Such a system typically contains knowledge base on the accumulated experience and a set of rules for applying the knowledge base on each particular situation that is described to the program. E.g. an expert can give a medical advice.

Applications of Expert systems

i) Medical diagnosis (the knowledge base would contain medical information, the symptoms of the patient would be used as the query, and the advice would be a diagnose of the patient’s illness)

ii) Playing **strategy games** like **chess** against a computer (the knowledge base would contain strategies and moves, the player's moves would be used as the query, and the output would be the computer's 'expert' moves)

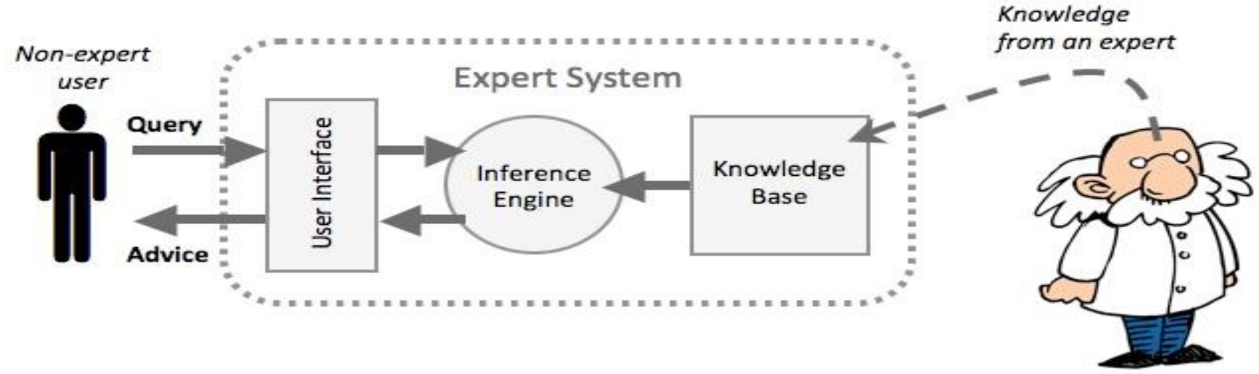
iii) Providing **financial advice -** whether to invest in a business, etc. (the knowledge base would contain data about the performance of financial markets and businesses in the past)

iv) Helping to **identify items** such as plants / animals / rocks / etc. (the knowledge base would contain characteristics of every item, the details of an unknown item would be used as the query, and the advice would be a likely identification)

v) Helping to **discover locations to drill for water / oil** (the knowledge base would contain characteristics of likely rock formations where oil / water could be found, the details of a particular location would be used as the query, and the advice would be the likelihood of finding oil / water there)

(b) An expert system is made up of three parts:

- A **user interface -** This is the system that allows a non-expert user to query (question) the expert system, and to receive advice. The user-interface is designed to be a simple to use as possible.
- A **knowledge base -** This is a collection of facts and rules. The knowledge base is created from information provided by human experts
- An **inference engine -** This acts rather like a search engine, examining the knowledge base for information that matches the user's query



(ii)(a) *Electronic Conferencing* (*Teleconferencing) means meeting through a telecommunications medium. It is a generic term for linking people between two or more locations by electronics. There are at least six types of teleconferencing: audio, audiographic, computer, video, business television (BTV), and distance education.*

- Audio Teleconference: Voice-only; sometimes called conference calling. Interactively links people in remote locations via telephone lines. Audio bridges tie all lines together. Meetings can be conducted via audio conference. *Preplanning is necessary which includes naming a chair, setting an agenda, and providing printed materials to participants ahead of time so that they can be reviewed.*

- Computer Teleconference: Uses telephone lines to connect two or more computers and modems. Anything that can be done on a computer can be sent over the lines.

- Video Teleconference: Combines audio and video to provide voice communications and video images. Can be one-way video/two-way audio, or two-way video/two-way audio. It can display anything that can be captured by a TV camera.

- Audio graphics Teleconference: Uses narrowband telecommunications channels to transmit visual information such as graphics, alpha-numerics, documents, and video pictures as an adjunct to voice communication. Other terms are desk-top computer conferencing and enhanced audio. Devices include electronic tablets/boards, freeze-frame video terminals, integrated graphics systems (as part of personal computers), Fax, remote-access microfiche and slide projectors, optical graphic scanners, and voice/data terminals.

(b) *Benefits of Electronic conferencing to an organization*

- **Save Time**: Content presented by one or many sources is received in many places simultaneously and instantly. Travel is reduced resulting in more productive time. Communication is improved and meetings are more efficient. It adds a competitive edge that face-to-face meetings do not.

- **Lower Costs**: Costs (travel, meals, lodging) are reduced by keeping employees in the office, speeding up product development cycles, improving performance through frequent meetings with timely information.

- **Accessible**: Through any origination site in the world. Larger Audiences: More people can attend. The larger the audience, the lower the cost per person.

(iii) *Advantages and disadvantages of using email*

Advantages
- **cheap -** sending an email costs the same regardless of distance and the number of people you send it to
- **fast -** an email should reach its recipient in minutes, or at the most within a few hours
- **convenient -** your message will be stored until the recipient is ready to read it, and you can easily send the same message to a large number of people
- **permanent -** you can keep a record of messages and replies, including details of when a message was received

Disadvantages
- **Spam -** unsolicited email can overwhelm your email system unless you install a firewall and anti-spam software. Other internet and email security issues may arise, especially if you're using the cloud or remote access.
- **Viruses -** easily spread through email attachments. See how to detect spam, malware and viruses.
- **Sending emails by mistake -** at a click of a button, an email can go to the wrong person accidentally, potentially leaking confidential data and sensitive business information. You should take care to minimize the likelihood of business data breach and theft.
- **Data storage -** electronic storing space can become a problem, particularly where emails with large attachments are widely distributed.

7(i) *Computer crimes in Cameroon are not different from crimes committed in other countries, In this case the student is required to name the computer crimes and chosing those which apply to our country.*

- **Cyber terrorism**: Cyber terrorism can be defined as an act of terrorism (Hacking, threats and blackmailing towards a business or person) committed through the use of cyberspace or computer resources. As such, a simple propaganda in the Internet, that there will be bomb attacks during the holidays can be considered cyber terrorism.
- **Computer Fraud** is any act using computers, the internet, internet devices, internet services, to defraud people, companies, or government agencies of money, revenue, or internet access.
- **Identity Theft;** pretending to be someone you are not.
- **Unauthorized access:** Gaining access to systems you have no permission to access. This is when someone gains access to a website, program, server, service, or other system using someone else's account or other methods. For example, if someone kept guessing a password or username for an account that was not theirs until they gained access it is considered to be unauthorized

(ii) *Measures to combat Computer crimes*

- Encrypt confidential data stored in computers or transmitted over communication networks.
- Install intrusion detection systems to help detect any unauthorized access to the system.
- Reporting cyber terrorists to ISPs, who are beginning to get together to blacklist email abusers
- Governments passing laws to punish persistent spammers with heavy fines

(iii) *The Data Protection Act is aimed at protecting the rights of individuals to privacy. It protects personal data from being misused.* The Act is important because it provides guidance and best practice rules for organizations and the government to follow on how to use personal data including:

1. Regulating the processing of personal data
2. Protecting the rights of the data subject
3. Enabling the Data Protection Authority to enforce rules
4. Holding organizations liable to fines in the event of a breach of the rules

(iv) (a) *Database Administrator:* A database administrator designs and develops a database application, control access to the data and keep the data updated.

(b) *System Analyst and Designers:* A system analyst helps in the development of a new system by analysing the existing system in order to improve on the functionality of the new system. He interviews users who need the system as well as define and design the hardware and software systems for a new system to be developed.

(c) *Programmers:* A computer programmer writes application programs or system, test and debugs programs and maintains the programs.

(d) *Network Administrator:* For a better data communication, a database administrator sets up a network, access privileges and monitors the use of the network and resources.

8(i)(a) **high-level languages**; some examples include BASIC, FORTRAN, Java, C++ and Pascal

(b) **Machine Independent**; A Programming language which is machine independent is that which can run on any machine. For example, of this type of language is Java. In essence, the output of the programming language will be same no matter what computer it is run on.

Machine Oriented: refers to any machine language that has the capabilities of a high-level programming language. Machine-oriented high-level language primarily enables building programs in assembly language or machine language to gain more control over the underlying hardware architecture.

(c) *Differences between high level and low level language*

- *Speed*

Low Level language programs are faster than High Level language programs as they do not need to convert.

They have less number of syntaxes, functions, keywords, class libraries.

- *Easiness*

Low Level language programs are not as easy as High Level language. There are only two Low Level programming languages Binary and Assembly. Binary has only 0's, 1's, while Assembly has some difficult type symbols which are knows as mnemonics.

But, the High Level languages programs are easy to write, read, modify and understand.

- *Performance*

Since, Low Level Languages programs are faster, so performance of Low Level languages programs are better than the High Level languages programs.

- *Translation*

Low Level language Binary does not need translation as Binary codes are Machine codes and computer understands them without any translations.

Assembly needs an Assembler to translate an Assembly program to its equivalent Binary/Machine Code.

High Level Languages are translated by the compilers or interpreters; sometimes (in case of some programming languages) both are required to get the Object/Binary file.

- *Platform Dependencies*

First, you should know about the platform, here platform means Computer Hardware (Computer configuration).

Low Level programming languages are platform dependent that means programs written in Low Level language can run on the same hardware with same configuration, you cannot run them on hardware that has different configuration.

High Level programming languages are platform independent that means programs written in High Level language can run on different hardware with different configuration.

(ii)(a) *Algorithm to calculate workers' wages*

```
Display ("Enter the number of hours worked:")
Input (number of hours, n)
Display ("Enter the pay rate:")
Input (pay rate, p)
  if (n<40)
          wages = n*p;
  else
          wages = n*1.5*p;
Display (wages)
```

NB: Display stands for information which appears on the screen for viewing. Input stands for information entered by the user

(b) The number of hours worked by the work is greater than 40 (n>40)

hence, the wage = number of hours worked x 1.5 x pay rate

$= n \times 1.5 \times p$

$= 43 \times 1.5 \times 1000$

= 64500frs

9(i) *Difference between Network Topology and Network configuration*

Network configuration is the process of setting a network's controls, flow and operation to support the network communication of an organization and/or network owner. This broad term incorporates multiple configuration and setup processes on network hardware, software and other supporting devices and components. Network configuration is also known as network setup.

Network topology is the arrangement of the various elements (links, nodes, etc.) of a computer network. Essentially, it is the topological structure of a network and may be depicted physically or logically. Most famous Network topologies are star, mesh, bus, hybrid, ring etc..,

(ii) Types of network Configurations

- **Client/Server Architecture:** Client/server is a network architecture in which a more powerful computer called server is dedicated to serving less powerful computers called clients. Servers hold shared resources like files, programs and the network operating system. They provide access to network resources to all the users of the network.

- **Peer-to-Peer Architecture:** Peer-to-peer (P2P) is a network configuration in which all the workstations (computers) have equal capabilities and responsibilities. Each workstation acts both as a server and a client. This means that any computer on the network can provide services to any other computer.

(iii)(a) Personal Area Network (PAN), Local Area Network (LAN)

(b) Wide Area Network (WAN)
(c) Metropolitan Area Network (MAN)
(d) Campus Area Network (CAN), Local Area Network (LAN)

(iv) - ***Convert 101101.01011 to decimal***
to convert this number, we will to convert them as two separate parts, whole and fractional part. Then convert the two parts independently and combine the results.
Whole part: 101101
= $1x2^5 + 0x\ 2^4 + 1x2^3 + 1x2^2 + 0x2^1 + 1x2^0$
= 32 + 8 + 4 + 1
= 45_{10}
Fractional Part: .01011
= $0x2^{-1} + 1x\ 2^{-2} + 0x2^{-3} + 1x2^{-4} + 1x2^{-5}$
= 0.25 + 0.0625 + 0.03125

= 0.34375

Combining the two parts, we get;

$101101.01011_2 = 45.34375_{10}$

- ***Convert 268_{10} to octal***

Two methods can be used;

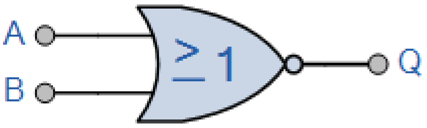
- Repeated division by 8
- Conversion to binary and subsequent grouping of bits (3)

We will use the first method (repeated division by 8) in this section. I'll invite you to read chapter 6, section 6.5 in Fundamentals of ICT for Cameroon secondary schools to learn more techniques on converting numbers from one base to another.

268/8 = 33 Remainder 4 (Least Significant Digit)
33/8 = 4 Remainder 1
4/8 = 0 Remainder 4 (Most Significant digit)
Therefore **$268_{10} = 414_8$**

- ***Convert 11101011011 to Octal***

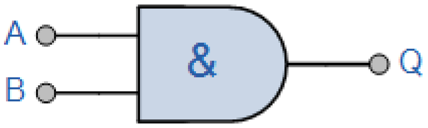
Step1: make groups of three bits starting from the least significant bit and move towards the most significant bit.
Step 2: replace each group of bits by its octal representation.
11101011011 = 11 101 011 011 (Grouping of three bits)
3 5 3 3 (Octal representation of the three bits)
= 3533_8
(v) *Logic Symbol and truth table of NOR and AND gates*



2-input NOR Gate
Boolean Expression **Q** = $\overline{A + B}$ (Read as A **OR** B gives **NOT** Q)

Truth Table

A	**B**	**Q**
0	0	1
0	1	0
1	0	0
1	1	0



Truth Table		
A	**B**	**Q**
0	0	0
0	1	0
1	0	0
1	1	1

2-input AND Gate

Boolean Expression **Q = A.B (**Read as A **AND** B gives Q)

vi) An **operating system** is a program that acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs. Some popular Operating Systems include Linux, Windows, OS X, VMS, OS/400, AIX, z/OS, etc. Following are some of important functions of an operating System; Memory Management, Processor Management, Device Management, File Management, Security, Control over system performance, Job accounting, Error detecting aids, Coordination between other software and users,

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1(i) **- Computer Vision problems:** Too much focus on a computer screen is bad for the eyes. Complications could arise from prolonged exposure to computers, tablets, and smartphones.

- Repetitive Stress Injury: When you continue to stress your musculoskeletal parts, it may indicate repetitive stress injury. The most common parts affected of this are the neck, shoulder, and your fingers.

- Stress: Prolonged computer use also increased the risk of people to stress. The hazards of computer use, plus poor health, job environment, and work pressure provide stress. It can also lead to poor concentration, weariness, and constant headaches.

- Radiation: Cathode Ray Tube (CRT) on the monitor which emits X-ray radiation is extremely bad for the health. Being exposed to radiation can increase one's risk to cancer, migraines, insomnia, and tumors. It can also lead to miscarriage and birth defects.

- Obesity: The use of computer makes these people, especially children to be inactive, which will increase their risk to obesity and later on, to diabetes and heart disorders.

(ii) – Reduce the light intensity of your screens.
- Service repairs to all screens(monitors) which flickers.
- Take regular breaks after working for long hours on your computer.
- Replace computer parts (monitors) which emits radiation with that which emits little or no radiation (example: Flat Panel Display Screens)
- Apply ice massage on body parts (example: Wrists) which are injured.

(iii) (a) **Robots** are machines. There are lots of types of **robots**. They move in different ways and do all kinds of jobs. Because a **robot** is a machine we have to program it to do things. It only does what we tell it to do.

(b) Advantages of robots over human workers
- They are more precise and consistent than human workers.
- They are able to capable of performing a variety of tasks and applications
- They have the ability to work around the clock since they do not require vacations, sick days, or breaks.
- They can work in any environment, adding to their flexibility. eliminate dangerous jobs for humans because they are capable of working in hazardous environments.

2(i) A – 2. Has barcode been found?
B – 3. Lookup the price of the item in the file
C – 7. Update stock file
D – 1. Anymore barcode to read

E – 5. Output Itemized bill
F – 4. Output error message
G – 6. Reject item

(ii) (a) *Feasibility analysis is a study which investigates the information needs of prospective users and determines the resource requirements, cost, benefits, and workability of a proposed project. Feasibility of a system can be evaluated in terms of four major categories: organizational feasibility, technical feasibility, economic feasibility and operational feasibility.*

- **Organizational feasibility**: focuses on how well a proposed information system supports the objectives of the organization and its strategic plan for information systems.
- **Technical feasibility**: focuses on the reliability/capabilities of the hardware and software to meet the needs of the proposed system, and whether they can be acquired or developed in the required time.
- **Economic feasibility**: focuses on whether the tangible costs and benefits of the proposed system will exceed the costs of developing and operating it.
- **Operational feasibility**: focuses on the ability of the end users to operate, use, and support the proposed system.

(b) *There are many different methods used by systems analysts to gather the information required to design an information system. It is vital that they gather relevant information from the client that clearly outlines what they want the system to do and what it should be capable of doing. Otherwise the system created will just be a waste of the analysts time and resources.*

- **Interviews**: The aim of an interview is to gather information, facts and opinions from the person being interviewed through a series of insightful questions. It is important that the systems analyst plans the questions they plan to ask in advance in order to ensure they gather all the necessary information and detail they require. An interview allows the interviewee to provide long, detailed answers if they require and it provides the interviewer the opportunity to respond and ask questions that may stem from the answers given.

- **Questionnaires:** Questionnaires are another traditional method used by systems analysts. There are often more questions in a questionnaire than in an interview so it is another important source of information for the analyst before they begin designing the information system. Questions featured on a survey can be open or closed. A questionnaire allows the subject time to think about their answer and time to recall previous events or thoughts. Another advantage of questionnaires is that they are less time consuming than interviews.

- **Observation:** This method involves the system analyst observing their client in their daily routine in order to gather information. It is a good method to use along with interviews, however it is a flawed method; some people may act differently when they know they are being observed.

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3. (i)(a) See answer to question 6(i)(a) June 2010

(b) **Geographical information systems (GIS)**: A GIS is software that allows information to viewed in form of maps. It is a computer system used for capturing, storing, checking and displaying data related to position on the earth's surface. It displays information in the form of maps. The GIS technology can enable to compare the location of different things in order to discover how they relate to each other. It enables experts view locations such as latitudes, longitudes, address or ZIP codes. The system can include data about people such as the population, income and educational level, about land such as the location of streams, different types of vegetation and different kinds of soil.

(c) **Simulation systems**: Simulation is a process where one tries to imitate the behaviour of an object such as a system, a real device, a process, a condition or state of affairs, with the behaviour of another object or other system to see the possible outcomes. Simulation is used in areas such as modelling natural systems, simulating human systems to have knowledge about the function or behaviour of these systems. It is also used to predict real world practical situations. There are basically two types of simulation:

physical simulation, where physical objects are used to substitute for real objects and interactive simulation where humans are actively involved in the simulation; for example, astronauts simulating the effects of weightlessness in space.

(d) **Reservation Systems**: Airlines use computers to keep records of flights, seat availability, passengers, crew members and other employees (flight reservation system). By entering the flight number and date, a reservation clerk can immediately inform a passenger whether or not seats are available. If a seat is not available, the computer can quickly give the closest date on which seats are available. All flights and passenger records are stored on a computer system in one location. Travel agencies all over the world can access this data via communication links (telephone or internet). This makes it very easy to confirm (or deny) a seat reservation.

Hotels, theatres and car rental agencies all use computer systems to keep records of room availability, seat availability and car availability respectively.

(ii) - *Cost Effective*: The entire financial transactions will eventually become electronic, so sooner conversion is going to be lower on cost. It makes every transaction through ecommerce payment a lot cheaper.

- *Higher Margin*: E-commerce also enables us to move better with higher margin for more business safety. Higher margin also means business with more control as well as flexibility.

You can also save time from the e-commerce.

- *Better Productivity*: Productivity here means productivity for both companies and customers. People like to find answers online because it is faster and cheaper, and it costs a lot cheaper expense as well for the company.
- *Quick Comparison*: E-commerce also enables you to compare price among several providers. In the end, it leads you to smart shopping. People can save more money while they shop.

(iii) - *Security*: Customers need to be confident and trust the provider of payment method.

Sometimes, we can be tricked. Examine on integrity and reputation of the web stores before you decide to buy.

- *Scalability of System*: A company definitely needs a well-developed website to support numbers of customers at a time. If your web destination is not well enough, you better forget it.
- *Integrity on Data and System*: Customers need secure access all the time. In addition to it, protection to data is also essential. Unless the transaction can provide it, we should refuse for e-commerce.

4(i)(a) **Online**: Online, in a generic sense, refers to when an electronic device is on and connected to other devices, such as another computer, a network or a device such as a printer.

More recently, the term online has come to mean connected to the Internet. In this case, either a person may be online when he or she is using the Internet, or the computer itself may be said to online when it has established an Internet connection.

(b) **Central Computer:** In networking, this term is attributed to the computer which serves as the supervisor of all other connected computers on a network. The term itself refers to the main computer which holds shared resources like files, programs and the network operating system. They provide access to network resources to all the users of the network.

(ii) **- Bank**:

Advantage: High interest rate offers, Lower fees.

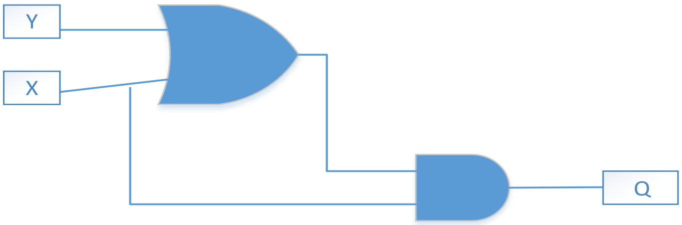
Disadvantage: No face-to-face customer service, limited capabilities compared to retail banks.

- Customer:

Advantage: You have twenty-four-hour access. When your neighbourhood bank closes, you can still access your account and make transactions online.

Disadvantage: Online banking is generally secure, but it certainly isn't always secure. Identity theft is running rampant, and banks are by no means immune.

(iii)(a) **CPU**: It is the part of the computer that interprets and executes program instructions. It also controls the other components of the system.
(b) **RAM**: short for Random Access memory: It holds programs and data that the CPU is currently working with. It also called the working space of the computer system.
(c) **Motherboard**: The motherboard is the main printed circuit board in the computer which holds the chipset and other electronic components that give function to the computer. The motherboard is indispensable to the computer and provides the main computing capability.
(iv) *Logic Symbol:*



Truth table

X	Y	X OR Y	X AND (X OR Y)
0	0	0	0
0	1	1	0
1	0	1	1
1	1	1	1

5(i)(a) A – Arithmetic Logic Unit (ALU): is a digital circuit used to perform arithmetic and logic operations. It represents the fundamental building block of the central **processing** unit (CPU) of a computer.
(b) Another name for main memory is internal memory, immediate access memory or primary memory; It holds programs and data that the CPU is currently working with.
(c) *How does the size of the main memory affect the computer performance?*
RAM has two main attributes that affect your system's performance: *memory capacity* and *memory speed*.
- *Memory capacity:* The more gigabytes (GB) your memory module has, the more programs you can have open at once.
- *Memory Speed:* The amount of time that it takes RAM to receive a request from the processor and then read or write data. Generally, the faster the RAM, the faster the processing speed.
(d) - **Registers:** Registers are special storage locations within the CPU that offer an advantage of speed. They work under the direction of the control unit to accept and hold data that is being processed.
- Cache Memory: Cache memory is a smaller and faster memory between the CPU and main memory, which stores copies of data from the most frequently accessed memory locations.
(ii)

Ink Jet	Sprays ink through tiny nozzles on the paper
Laser	It makes a laser beam scan back and forth across a drum inside the printer, building up a pattern of static electricity. The static electricity attracts onto the page a kind of powdered ink called toner. Finally, as in a photocopier, a fuser unit bonds the toner to the paper.
Dot matrix	They create an image on paper by striking pins against an inked ribbon. The ink is transferred to the paper as closely shaped **dots** that form each character.

(iii) *Advantages of Matrix printers*
- The Dot matrix printers are cheap and easily available in the market.
- They can make carbon copies of the print out unlike non-impact printers.
- The printing costs are the lowest as compared to other printers.
- The printout fades gradually rather than coming to a halt suddenly. You therefore get plenty of time to change the ribbon before crisis emerges.
- They use paper continuously unlike other printers that require frequent change of paper.

- The maintenance cost is low as compared to other printers.

6(i)(a) *Floppy though not in use today, have some differences with compact disks. In terms of method of storage, we could say, how do these devices store data on their different media?*
A floppy disk stores data on a film or tape in this manner, (they are like flash drives back then) while data is written on a compact disc by the use of laser creating "grooves" (similar to how a vinyl works).
(b) the storage capacity of floppy disks can range only up to 1.44MB,
Thus, $\frac{750\,MB}{1.44MB}$ = 521 floppy drives will contain the same amount of information in a standard 750Mb CD
(iii)(a) **Tracks**: A track holds too much information to be suitable as the smallest unit of storage on a disk, so each one is further broken down into *sectors.*
(b) **Sectors**: A sector is normally the smallest individually-addressable unit of information stored on a hard disk, and normally holds 512 bytes of information.
(iv) *There is a remark I would like to make before proceeding;* ***A hard disk doesn't organize data, the file system organizes it.***
A hard disk is usually made up of multiple platters, each of which use two heads to record and read data, one for the top of the platter and one for the bottom. The heads that access the platters are locked together on an assembly of head arms. This means that all the heads move in and out together, so each head is always physically located at the same track number. It is not possible to have one head at track 0 and another at track 1,000.

Because of this arrangement, often the track location of the heads is not referred to as a track number but rather as a *cylinder* number. A cylinder is basically the set of all tracks that all the heads are currently located at. So if a disk had four platters, it would (normally) have eight heads, and cylinder number 720 (for example) would be made up of the set of eight tracks, one per platter surface, at track number 720. The name comes from the fact that if you mentally visualize these tracks, they form a skeletal cylinder because they are equal-sized circles stacked one on top of the other in space.

For most practical purposes, there really isn't much difference between tracks and cylinders--its basically a different way of thinking about the same thing. The addressing of individual sectors of the disk is traditionally done by referring to cylinders, heads and sectors (CHS). Since a cylinder is the collection of track numbers located at all of the heads of the disk, the specification "track number plus head number" is equal to "(cylinder number plus head number) plus head number", which is thus the same as "track number plus head number".

(v) One of the biggest reasons for defragmenting your hard drive is you'll likely experience faster speeds and less loading time. When your files are not scattered but are stored in one place, they load faster and your whole system speeds up. Your computer can sort and locate files much easier.

(vi) Disk formatting is the process of preparing a data storage device such as a hard disk drive, solid-state drive, floppy disk or USB flash drive for initial use. In some cases, the formatting operation may also create one or more new file systems. Formatting is also a way to make reasonably certain the data on a disk has been erased.

7(i)(a) *Advantages of using laptop computers over Desktop computers:*
- Laptop computers are highly portable and allow you to use your computer almost anywhere.
- Laptop computers take up less room on a desk or table and can be put away when not in use.
- Laptop computers have a single cord to contend with, rather than the multiple cords associated with desktop computer use.

(b) *Advantages of Desktop computers over laptop computers*
- Desktop computers are easier, and less expensive, to upgrade.
- Desktop computers are generally less expensive overall and offer a better overall value

- Desktop computers are generally easier, and less expensive, to repair.
- Desktop computers have a lower risk of theft, which means less chance of losing your data and having to pay to replace your computer.
- Desktop computers have larger monitors.

(ii)(a) **Spreadsheet package**:

- Creating Graphs e.g. bar chart, pie chart.
- Collect data from different sources e.g. phone number, prices.
- Explore and interpret data in order to draw conclusions for business.
- Generating Invoices
- Wages
- Predictions / Simulations
- Calculations e.g. Adding, Subtracting, etc.

Database Software package:

- Databases can store very large numbers of records efficiently (they take up little space).
- It is very quick and easy to find information.
- It is easy to add new data and to edit or delete old data.
- Data can be searched easily, eg 'find all Ford cars'.
- Data can be sorted easily, for example into 'date first registered' order.
- More than one person can access the same database at the same time - multi-access.
- Security may be better than in paper files.

Desktop Publishing Package: often used for;

- *Text* - can be styled using a wide range of fonts, effects and colors.
- *Background colors* - can be changed for blocks of text and images. Text can be wrapped around images.
- *Page layout templates* - can be set up so that each page has the same appearance.

(b) Three features of Word processing software which can alter the design so that it can fit in one page are; *changing the page margins, changing the font type and size, reducing the spacing between lines.*

Changing the page margins: On the tab bar, select “Page Layout”, then select “Margins”. Chose the margins which best fits to your adjustments. The ideal choice will be the custom margins, where you will have to adjust the margins and make the content fit into one page.

Changing font type and size: In most cases, the choice of font types doesn’t change a great deal. It simply helps make the content readable. This option is first mentioned because our goal will be to fit the content in one page, without making it hard to read. Therefore, the choice of the font type should be carefully taken and adjusted with the corresponding font sizes. For examples: for a document, if using Times News Romans (font type), it is recommended to use the font size 12, if the content still overlaps, the font size could be dropped to 11.

Reducing the spacing between lines: Word processing software have some features which automatically add lines between paragraphs and also maintains some standard line spacing in order to make the content easily recognizable and readable. Thus, altering the spacing between these lines will eventually reduce some white space in the document and adjust the design to fit one page.

(c) *The tremendous growth in the use of computing devices has led to the unpredictable growth in data storage. This question aims at knowing the advantages of spreadsheets over databases. Databases has so many advantages over spreadsheets, in this question, we will try outline a few limitations of databases.*

Complexity: Databases are complex hardware and software systems. In addition to the storage media, databases have software modules for accessing, manipulating and displaying the data. Database design and development is a complex undertaking, requiring experienced designers and significant financial resources. Therefore, small and large businesses typically acquire commercial databases and customize them to fit corporate requirements.

Compatibility: There is a risk that a database management system might not be compatible with a company's operational requirements. For example, if a small business wants to store detailed customer information or email traffic, it may find that its existing database cannot support the additional data fields or the new queries and reports.

8(i)(a) SDLC is a structured step-by-step approach for creating and maintaining information systems. It consists of a number of stages that describe the activities involved in an information system development process.

(b) SDLC involves the following stages: **system study, system analysis, system design, development and testing, implementation,** and **maintenance**.

(c) The following are the key stages of the cycle:

- **System Analysis:** This is the first step, when the team decide what the software needs to do. The main point is to think about what the **user** will want from the program. At this stage, it might be a good idea to ask other people what they want from the software. Who is going to use it? What information do they need to **input**? What information or data does it need to **output**?
- **System Design -** the team work out the details of the program by breaking it down into smaller chunks. This includes thinking about the visual appearance and the programming behind the software. The team will use pseudocode and diagrams to work out how the program should go.
- **Implementation -** the program code is written. Good pseudocode allows the implementation stage to be relatively easy. The code is normally written in a high-level language.
- **Testing -** this involves testing the program under various conditions to make sure it is going to work. You need to think about what devices it could be used on and what might cause the program to crash.
- **Maintenance -** the software is ready to be launched, but after it has been launched you will need to think about how the software evolves. Software needs to be maintained to ensure it works on new systems. Smartphone apps are constantly being maintained to make sure they work on the latest smartphones and computers.

(d) *See question 4(ii)(a) June 2010*

(ii)(a) **Project:** A project is an endeavor to accomplish a specific objective through a unique set of interrelated tasks and the effective utilization of resources. A project has a definite start and finish time, well-defined outcomes or performance goals, and consumes scarce resources such as money, personnel, material, and equipment.

(b) **Critical task**: a task found on the critical path (*a sequence of dependent tasks that have the largest sum of most likely durations. The critical path determines the earliest possible completion date of the project).* A critical task cannot be delayed without delaying the entire project schedule.

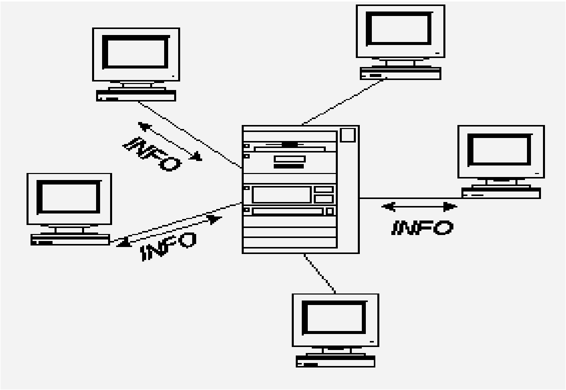
(c) **Task(Activity):** anything that needs to be done that requires time and consumes resources.

9(i) A computer network is the interconnection of two or more computers to share resources (hardware, software and data) and communicate with one another. The connections (network links) between nodes are established using either cable media or wireless media.

(ii) *See answer to question 9(i) June 2010*

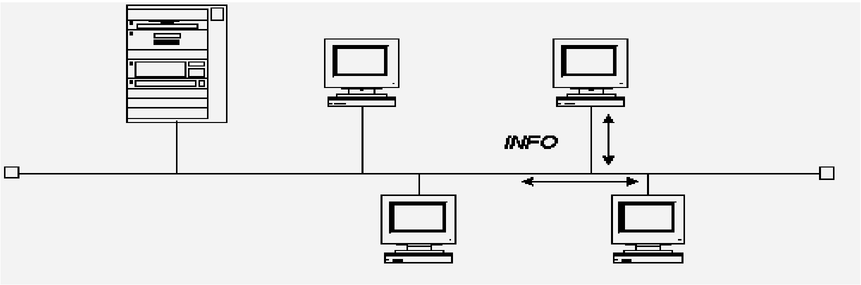
(iii) *See answer to question 9(ii) June 2010*

(iv) **- Star topology:** In the star configuration, each workstation or communication device is connected to the central computer or server by means of its own unique link. Star topology is mostly used in schools and offices because they tend to be the most reliable of the topologies.



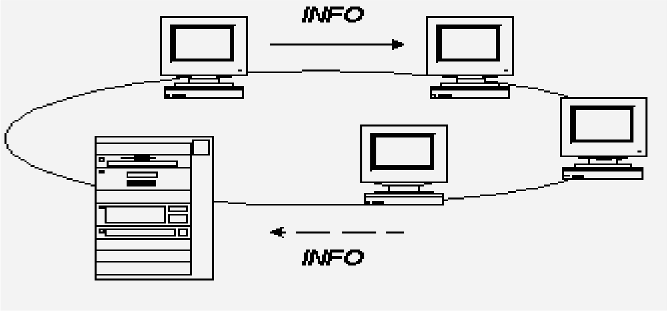
A star topology

- **Bus topology:** In bus topology, it is a single cable that joins all the workstations, printer, file servers and other components together. At each end of the bus is a terminator. A terminator is a piece of hardware which prevents signals bouncing back and forth (echoes). This topology has as advantage the fact that it is easy to install, use less cables and easy to add extra workstations. The main disadvantage is that if the central cable breaks down, the entire network stops working.



Bus topology

- **Ring topology:** In the ring topology layout, all the computers are connected to one another in a circle. Data pass from one computer to the net one and then all the way round the ring until it reaches the destination computer. If the message is intended for the station, it is received; otherwise it is boosted by a repeater and sent to the next station until it reaches its destination.



Ring topology

(v) Transmission Media: Wired and Wireless transmission media

Wired transmission media includes: coaxial cable, fibre optics, Twisted pair wires

- **Twisted Pair Wires**: Twisted-pair cabling consist of copper wires that are twisted into pairs. Ordinary telephone wires consist of two insulated copper wires twisted into pairs. Computer network cabling consists of 4 pairs of copper cabling that can be utilized for both voice and data transmission. The use of two wires twisted together helps to reduce crosstalk and electromagnetic induction. Twisted pair cabling comes in two forms: unshielded twisted pair (UTP) and shielded twisted-pair (STP).
- **Coaxial Cable**: Coaxial cable is widely used for cable television systems, office buildings, and other work-sites for local area networks. The cables consist of copper or aluminium wire surrounded by an insulating layer (typically a flexible material with a high dielectric constant), which itself is surrounded by a conductive layer. The insulation helps minimize interference and distortion.
- **Fibre Optics:** An optical fibre is a glass fibre. It carries pulses of light that represent data. Some advantages of optical fibres over metal wires are very low transmission loss and immunity from electrical

interference. Optical fibres can simultaneously carry multiple wavelengths of light, which greatly increases the rate that data can be sent, and helps enable data rates of up to trillions of bits per second. Optic fibres can be used for long runs of cable carrying very high data rates, and are used for undersea cables to interconnect continents.

Wireless transmission includes: Infrared waves, Microwaves, Radio waves

- **Infrared Waves**: Infrared uses transmitters/receivers (transceivers) that modulate non-coherent infrared light. Infrared signals do not penetrate walls as such transceivers must be within line-of-sight either directly or via reflection. Line of sight is a type of propagation that can transmit and receive data only where transmit and receive stations are in view of each other without any sort of an obstacle between them.
- **Radio waves**: Radio wave systems transmit signals by modulation of electromagnetic waves with frequencies below that of visible light. Radio waves carry information by systematically changing some property of the radiated waves such as amplitude (AM radio), frequency (FM radio) and phase.
- **Microwaves**: Microwaves are electromagnetic radiations beyond the frequency range of radio and television. There are two types of microwave systems: terrestrial microwave systems and satellite systems.

(vi) *Difference between Hub and switch.*

	Hub	**Switch**
Data Transmission form	Electrical signal or bits	Frame (L2 Switch) Frame & Packet (L3 switch)
Transmission Type	Hubs always perform frame flooding; may be unicast, multicast or broadcast	First broadcast; then unicast & multicast as needed.
Device Type	Passive Device (Without Software)	Active Device (With Software) & Networking device
Table	A network hub cannot learn or store MAC address.	Switches use content accessible memory CAM table which is typically accessed by ASIC (Application Specific integrated chips).
Transmission Mode	Half duplex	Half/Full duplex
Definition	An electronic device that connects many network device together so that devices can exchange data	A network switch is a computer networking device that is used to connect many devices together on a computer network. A switch is considered more advanced than a hub because a switch will on send msg to device that needs or request it
Speed	10Mbps	10/100 Mbps, 1 Gbps
Collisions	Collisions occur commonly in setups using hubs.	No collisions occur in a full-duplex switch.

CGCEB JUNE 2012

1(i)(a) **BCD**: Binary Code Decimal is a system of writing numerals that a four-digit binary code to each digit 0 through 9 in a decimal (base 10) numeral. The four bit BCD code for any particular single base 10 digit is its presentation in binary notation; as follows
0=0000, 1=00001, 2=0010 etc.
(b) **ASCII** (American Standard Code for Information Exchange) is the most common format for text files computers and on the internet. In an ASCII file, each alphabetic numeric or special character is represented with 7-bit binary number (a string of seven Os or Ls). 128 possible characters are defined.

(c)) **EBCDIC**: Extended Binary Coded Decimal Interchange Code (EBCDIC) is an 8-bit character encoding used mainly on IBM mainframe and IBM midrange computer Os

(ii) *See answer to question 1(iii)(a) June 2011*

(iii) (a) ***Military***: The computers have played an increasingly important role in the military, The computers in the military have been adapted or designed to do a broad range of tasks, such as analysing intelligence, organizing prudent data for military leaders, geospatial analysis , controlling smart weapons , or communications.

- They are also used on Intercontinental Ballistic Missiles (ICBMs) that uses GPS and Computers to help the missile get to the target.

- Computers are used to track incoming missiles and help slew weapons systems onto the incoming target to destroy them.

- Computers are used in helping the military find out where all their assets are (Situational Awareness) and in Communications/Battle Management Systems.

- Computers are used in the logistic and ordering functions of getting equipments to and around the battlefield.

- Computers are used in tanks and planes and ships to target enemy forces, help run the platform and more recently to help diagnose any problems with the platforms.

- Computers help design and test new systems.

(b) ***Education***:

- *Distance Learning*: Distance learning is a new learning methodology. Computer plays the key role in this kind of learning. Many institutes are providing distance learning programs. The student does not need to come to the institute. The institute provides the reading material and the student attends virtual classroom. In virtual classroom, the teacher delivers lecture at his own workplace. The student can attend the lecture at home by connecting to a network. The student can also ask questions to the teacher.

- *Online Examination*: The trend of online examination is becoming popular. Different examinations are conducted online all over the world. The questions are marked by computer. It minimizes the chance of mistakes. It also enables to announce the result in time.

(c) ***Hospital***:

- *Hospital Management System*: Specialized hospital management softwares are used to automate the day to day procedures and operations at hospitals. These tasks may be Online appointments, payroll admittance and discharge records etc.

- *Patient History:* Hospital management systems can store data about patients. Computers are used to store data about patients, their diseases & symptoms, the medicines that are prescribed.

- *Patients Monitoring:* Monitoring systems are installed in medical wards and Intensive care units to monitoring patients continuously. These systems can monitor pulse, blood pressure and body temperature and can alert medical staff about any serious situations.

- *Life Support Systems***:** Specialized devices are used to help impaired patients like hearing aids.

- *Diagnosis Purpose***:** A variety of softwares are used to investigate symptoms and prescribed medication accordingly. Sophisticated systems are used for tests like CT Scan, ECG, and other medical tests.

(d) ***Multinational Cooperation***: The government works or official works took more time to complete in the past. There was lots of staff required in the past to manage citizen's works. But today citizens, consumers are getting a solution with high speed and accuracy. Because of the uses of computer in official works. There are so many applications that speed the process and quality of official works. Such as Microsoft Office package, email, video conferencing tools etc. are few applications that speed the work of government offices with accuracy.

(e) ***Manufacturing Industries:***

- *Payroll*; From printing or depositing pay checks, to applying raises and bonuses, industries have become highly reliant on computer management.

- *Customer Databases*: Customer databases are used not just to track order information for clients, but also to chronicle interactions to better serve clients in the future.

- *Inventory Tracking*: Using spreadsheets or databases, most businesses utilize some sort of computer maintained inventory tracking system.

(iv)(a) Decimal 120 to octal number

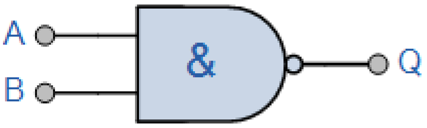
120/8=15 Remainder 0 (Least Significant digit)
15/8= 1 Remainder 7
1/8= 0 Remainder 1 (Most Significant Digit)
= 170_8

(b) *Two methods can be used;*
Method 1: conversion to decimal and subsequent division by 8 to get the octal number
Method 2: Grouping of the binary number in three bits.
In this section I used method 1.

$101101001 = 1\times2^8 + 1\times2^6 + 1\times2^5 + 1\times2^3 + 1\times2^0$
$= 256 + 64 + 32 + 8 + 1$
$= 361_{10}$

361/8=45 Remainder 1
45/8=5 Remainder 5
5/8=0 Remainder 5
$=551_8$

(iv) *Design and Truth table of OR and NAND gates*

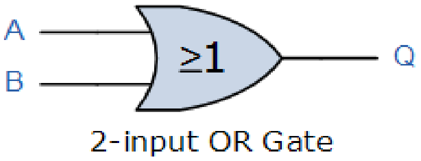


2-input NAND Gate

Truth Table		
A	**B**	**Q**
0	0	1
0	1	1
1	0	1
1	1	0

Boolean Expression **Q = A.B (**Read as A **AND** B gives **NOT** Q)

Symbol



2-input OR Gate

Truth Table		
A	**B**	**Q**
0	0	0
0	1	1
1	0	1
1	1	1

Boolean Expression **Q = A+B (**Read as A **OR** B gives Q)

2(i) - The computer is exposed to a wide range of persons thus it can be accessed without prior authorisation and easily altered.
- Computers are prone to malwares which may lead to data corruption.
- With the tremendous increase in cyber crimes, once a computer is connected to a network, it is vulnerable to cyber attacks, thus the integrity of its data is put in jeopardy.

(ii)(a) **Computer virus**: A virus is a computer program that can copy itself and infect a computer here it destroys files and disrupts the operation of the computer. A virus can spread from one computer to another (in some form of executable code) when its host is taken to the target computer.
(b) Sometimes there's no way to be sure, but often computers give hints that something isn't right. Some common actions(symptoms) which suggests the presence of a virus in it include;

- *When you connect to the Internet, all types of windows open or the browser displays pages you have not requested.* This is certain sign of infection. Many threats are designed to redirect traffic to certain websites against the user's will, and can even spoof Web pages, making you think you are on a legitimate site when really you have been taken to a malicious imitation.

- *Your computer is running extremely slowly.* This could be a symptom of many things, including infection by a virus. If it has been infected by a virus, worm or Trojan, among other things, which are running on the computer, they could be running tasks that consume a lot of resources, making the system run more slowly than usual.

- *Your computer speaks to you***:** There are all types of pop-ups and messages on the desktop either advertising things, saying that the PC is infected and needs protection. This is a typical, surefire case of an infection. There is either spyware on the computer, or it has been infected by a fake antivirus

- *Applications won't start***.** Sometimes another program might even run, this could be another type of problem, but at the very least it's a symptom that tells you that something is wrong.

(c) *Ways to prevent computer virus infecting your computer*

- Install an Antivirus Software (updating it constantly).
- Don't open any email attachment unless you are expecting them.
- Keep your computer updated
- Use a firewall -Windows Firewall (or any other firewall) can help alert you on suspicious activities if a virus or worm attempts to come to your computer.

(iii) (a) Use of firewalls, Use of authentication techniques (usernames and passwords)
(b) Keystroke logging; *Keystroke Logging often referred to as keylogging or keyboard capturing is the action of recording (or logging) the key struck on the keyboard, typically in a convert manner so that he person using the keyboard is unaware that are being monitored. It uses the study of human-computer interaction. There numerous keylogging methods ranging from hardware and software base approaches*
(c) Authentication (Username and Passwords, Smart cards, Biometrics)
(d) Passwords

(e) Firewalls
(f) Encryption.

(v) - **Intrusion Detection**: Intrusion detection is the art and science of sensing when a system or network is being used inappropriately or without authorization. An intrusion-detection system (IDS) monitors system and network resources and activities and, using information gathered from these sources, notifies the authorities when it identifies a possible intrusion.

3(i)(a) All internal threats to computer systems could be computer crimes. *See answer to question 7(i) June 2011.*
(b) *See answer to question 4(ii)(a) June 2015.*
(c) *See answer to question 7(ii) June 2011.*

(ii)(a) - **Filename**: name used to uniquely identify a computer file stored in a file system.

- **File compression**: is a process of "packaging" a file to use less disk space. Compression works at reducing redundancy in a files code.

- **File Allocation Table (FAT):** is a table that an operating system maintains on a hard disk that provides a map of the clusters (the basic units of logical storage on a hard disk) that a file has been stored in.

(b) Defragmentation is like cleaning house for your PC, it picks up all the pieces of data that are spread across your hard drive and puts them back together.
- It is important because every computer suffers from the constant growth of fragmentation and if you don't clean house your PC suffers.
- It helps in increasing PC's performance, avoid random crashes and freeze ups.
(c) Disk space before compression=28GB
After compression=28/15=1.97GB
=1867MB

4(i)(a) *See answer to question 1(i)(e) June 2013*
(b) *See answer to question 2(ii)(a) June 2018*
(ii)(a) Reservation systems: Transaction processing systems; Inputs are recorded by the computer but it deals with them after a short delay.
- Payroll : Batch processing. Payroll processing is made easy as automatic calculations can be made for several employees at a given time.
- Billing: Batch Processing; inputs (daily consumption) are not processed until a certain number have occurred or a set time has passed.
(b) *This question could also be regarded as the impact of computer systems on employment.*
- *Change of old Technology*; The computer has all but eliminated many pieces of equipment that were once essential in offices across the world, including the typewriter and switchboard. Switchboard duties are now handled through the use of computer software, while typewriters are very rarely used in most offices.
- *Bridging the Communication Gap*: Thanks to the emailing and instant messaging capabilities of computers connected to the Internet, you can ensure that every employee in your company is updated on the latest changes in company policies, the latest information from one department to another, and the latest information needed for inter-departmental meetings.
- *The Burden of Accuracy*: For secretaries, accuracy in typing was once an essential job requirement. Thanks to the editing abilities of modern word processing programs, making a few mistakes in typing is not the end of the world as long as the secretary proofreads the documents and corrects the mistakes before sending the information to other workers in the company.

- *Job Loss:* Personal computers have helped to lessen the negative impact of job loss. If someone loses a job in a factory or office, the option is now widely available to use the computer to work from home in a variety of positions ranging from merchandising to data entry.

(iii)(a) Modelling and simulation is getting information about how something will behave without actually testing it in real life. For instance, if we wanted to design a race car, but weren't sure what type of spoiler would improve fraction the most, we should be able to use computer simulation of the car to estimate the effect of the different spoiler shapes on the coefficient of friction in a turn. Computer models are cheaper to set up than alternative methods that could be used to predict what will happen in a system. E.g building a prototype other benefits include being able to;

- Make alternations and quickly see the outcome
- Repeat test several times over
- Learn from "what if" scenarios
- Model dangerous situations safety

(b) *see answer to question 6(ii)(a) June 2016*

5(i)

Disabilities	**Hardware/software**
Limited mobility	Wheel chair
Armless	Mouth or head stick or any pointing device
Slow typist	Word prediction programs
Blindness	Screen readers, Speech recognition programs

(ii)(a) **Data capture** is the act of getting information from the source into a structure that can be processed by a computer. Before information is sent into a computer, it has to be first of all collected from its source. The ways in which data is collected depends on the available methods to capture this data into a computer. There exist many methods that can be used to collect and enter data both manual and automatic.

(b) **Automatic Data Capture:** This method uses automatic data capture devices such as Bar Code Reader, Magnetic Ink Character Recognition (MICR), Optical Mark Reader (OMR), Optical Character Recognition (OCR), Digital Camera etc. *See answer to question 1(ii)(a) & (b) June 2014.*

(iii)(a) – **Intranet**: Intranet is defined as private network of computers within an organization with its own server and firewall. Moreover we can define Intranet as a system in which multiple PCs are networked to be connected to each other. PCs in intranet are not available to the world outside of the Intranet.

- **Extranet**: Extranet refers to network within an organization, using internet to connect to the outsiders in controlled manner. It helps to connect businesses with their customers and suppliers and therefore allows working in a collaborative manner.

(b) *Characteristics of Intranet and Extranet. For revision purposes, I included the Internet for better appraisals of the features of each network.*

Internet	**Intranet**	**Extranet**
World wide computer-based communication network	Internal computer-based communication network	An extended Intranet whereby external personnel are also able to connect to an Intranet.
A network of networks connected by high speed data channels such as leased lines, satellite links, undersea cables and mobile phone network	Based on the company LAN or WAN infrastructure. May be a virtual network within the LAN / WAN	Uses mobile phone network or a virtual private network (VPN) to establish a connection
It is an open network	It is a closed network	It is a closed network

Services such as Email and the Web are mostly open to the public.	Can be viewed or used by employees or authorized users only	Can be viewed or used by employees or authorized users only even if they are not connected to the LAN / WAN
World wide open access	Access from only within the company or organization	World-wide but private access to an Intranet.
Content and service providers from anywhere in the world	Content is mainly generated by internal people for use by other internal people	

(c) *Advantages of Intranet to an organisation:*
- *Communication*: Intranet offers easy and cheap communication within an organization. Employees can communicate using chat, e-mail or blogs.
- *Time Saving*: Information on Intranet is shared in real time.
- *Collaboration*: Information is distributed among the employees as according to requirement and it can be accessed by the authorized users, resulting in enhanced teamwork.
- *Platform Independency:* Intranet can connect computers and other devices with different architecture.
- *Cost Effective:* Employees can see the data and other documents using browser rather than printing them and distributing duplicate copies among the employees, which certainly decreases the cost.

Advantages of Extranet to an organisation;
- More integrated supply chains through the use of online ordering, order tracking and inventory management
- Reduced costs by making manuals and technical documentation available online to trading partners and customers
- More effective collaboration between business partners - perhaps members of a project team - by enabling them to work online on common documentation
- Improved business relationships with key trading partners because of the close collaborative working that extranets support
- Improved customer service by giving customers direct access to information and enabling them to resolve their own queries.

6(i)(a) **Telecommuting** is also known as teleworking. *See answer to question 2(i)(a) June 2010*
(b) *See answer to question 6(ii)(a) June 2010*
(c) *See answer to question 6(i)(a) June 2010*
(d) **Loader**: A loader is a major component of an operating system that ensures all necessary programs and libraries are loaded, which is essential during the startup phase of running a program. It places the libraries and programs into the main memory in order to prepare them for execution.
(ii) *See answer to question 6(i)&(ii) June 2013*

(iii)(a) **GIS**: Stands for Geographical information system.
A GIS is software that allows information to viewed in form of maps. It is a computer system used for capturing, storing, checking and displaying data related to position on the earth's surface. It displays information in the form of maps. The GIS technology can enable to compare the location of different things in order to discover how they relate to each other. It enables experts view locations such as latitudes, longitudes, address or ZIP codes. The system can include data about people such as the population, income and educational level, about land such as the location of streams, different types of vegetation and different kinds of soil.
(b) **HIS**: Stands for Health Information System
HIS refers to any system that captures, stores, manages or transmits information related to the health of individuals or organisation working in the health sector. This may include disease surveillance systems, laboratory information systems, hospital patient record, individual and public health.
(c) **EIS**: Stands for Executive Information System.

Executive information systems make a variety of critical information readily available in a highly summarized and convenient form, typically via a graphical digital dashboard. Senior managers characteristically employ many informal sources of information, however, so that formal, computerized information systems are only of partial assistance. In particular, these executives need to compare their organization's performance with that of its competitors and investigate general economic trends in regions or countries. Often individualized and relying on multiple media formats, executive information systems give their users an opportunity to "drill down" from summary information to increasingly focused details.

(d) **LIS**: Stands for Library Information System.

A typical library contains thousands of books, magazines, reports and other documents which users may wish to borrow. Maintaining records of books and borrowers are well suited with computer systems. Computer systems make it easier for library personnel to answer queries about status (Title, Author, ISBN Number) of books more easily than a manual system.

(iv) **Management Information System (MIS**): This provides information that a system requires to carry out an effective and efficient management of an organisation. MIS is a typical computer system used for managing an enterprise. It is used to analyse and facilitate strategic and operational activities in an enterprise. This system studies how individuals, groups and organisations evaluate, design, implement, manage and utilise systems to generate information to improve efficiency and effectiveness of decision making.

(v) *MIS generate three basic types of information or reports: detailed, summary and exception.*

- **Detailed reports**: Confirm transaction processing activities. A detailed order report is an example of a detail report.
- **Summary reports**: consolidate data into a format that an individual can review quickly and easily. To help synopsize information, a summary report typically contains totals, tables, or graphs. An inventory summary report is an example of a summary report.
- **Exception reports:** report information that is outside of a normal condition. These conditions called the exception criteria, define the range of what is considered normal activity or status. An example of an exception report is an inventory exception report that notifies the purchasing department of items it needs to reorder. Exception reports help managers save time because they do not have to search through a detailed report for exceptions. Instead, an exception report brings exceptions to the manager's attention in an easily identifiable form.

7(i) The question makes us understand that the new system has been created and is pending implementation, then we should simply check the system implementation techniques and describe them. The methods are; Parallel implementation, Direct implementation, pilot implementation, phase implementation. *See answer to question 4(ii)(a) June 2010*

(ii) Data verification methods: *see answer to question 1(i)(a) June 2013*.

(iii) **Input Controls** are an integral part to any form. They allow a user to perform a variety of functions, e.g., type in text, select items from a list, upload a file, etc.

1. *Check Box*

Question?

☐ Checkbox 1 ☐ Checkbox 2 ☐ Checkbox 3

2. *Drop-Down List Box*

Field Label:
Instructional Text

3. File Input Box

Field Label:
Instructional Text

4. Single Line Text Box

Field Label:
Instructional Text

Support Text

(iv) *Ways to ensure data is not accidentally lost*

- **Backup storage**: Backup is the process of making copies of data which may be used to restore the original data after a data loss event. Copies of data can be made and stored on storage devices like external hard drives, CDs and DVDs. Backups have two distinct purposes; to recover data after its loss, be it by data deletion or corruption and to recover data from an earlier time, according to a user defined data retention policy, typically configured within a backup application.
- **Archival storage**: Data archiving is the process of moving data that is no longer actively used to a separate data storage device for long-term retention. Data archive is often confused with data backup, which are copies of data. Data archives protect older information that is not needed for everyday operations but may occasionally need to be accessed while data backups are used to restore frequently used data in case it is corrupt or destroyed.

(v) *System testing*

Testing is the process of executing a program with the intent of finding an error. During testing, trial runs are done to check for errors and whether or not the new system meets the users' needs. Once source code has been generated, the software must be tested to uncover and correct as many errors as possible before delivery. There are three sets of data that can be used to test the system: normal data and abnormal data.

- *Normal data* is data which the system will accept.
- *Abnormal (erroneous) data* is invalid data which the system will reject.
- *Extreme data* are data values that are chosen at the absolute limits of the normal range.

This is to ensure that all normal values will be accepted and processed correctly.

8(i) *Borrower's Card*

Field	**Data type**	**Description**
Stud_ID	*Number*	Student's matricule number on library card
Stud_Name	*Text*	*Student's Names*
Stud_class	*Text*	*Student's class*
TitBook	*Text*	*Title of the book*
Bk_Author	*Text*	*Author of Book*
Book_ISBN	*Number*	*ISBN number(code) of book*
Sh_No	*Number*	*Shelf Number in the library*
Duration	*Number*	*Number of days borrower will spend with book*

(ii) *See answer to question 2(ii)(b) June 2011*

(iii) *This question aims at knowing the factors to consider when designing a new computer system. See answer to question 6(v) June 2015.*

(iv) *Output format displaying the details of borrower.*

Stud_ID	*Stud_Name*	*Stud_class*	*TitBook*	*Bk_Author*	*Bk_ISBN*	*Sh_No*	*Duration*
201801	*John Ambe*	*Upper sixth science*	*Fundamentals of ICT for Cameroon secondary schools*	*Nkweauseh Reginald Longfor*	*978-9956-549-31-2*	*32*	*14*

9(i) formula to calculate determinant of a matrix

Determinant = **A1*B2 – A2*B1**

(ii) Determinant = **MDETERM(A1:B2) for 2x2 array**

(iii) C code for determinant of a 2x2 matrix

```
#include<stdio.h>
int main()
{
   int a[2][2], i, j;
   long determinant;

   printf("\n\n Enter the 4 elements of the array\n");
   for(i = 0; i < 2; i++)
   for(j = 0; j < 2; j++)
   scanf("%d", &a[i][j]);

   printf("\n\nThe entered matrix is: \n\n");
   for(i = 0; i < 2; i++)
   {
      for(j = 0; j < 2; j++)
      {
         printf("%d\t", a[i][j]);   // to print the complete row
      }
      printf("\n"); // to move to the next row
   }

   // finding the determinant of a 2x2 matrix
   determinant = a[0][0]*a[1][1] - a[1][0]*a[0][1];
   printf("\n\n Determinant of 2x2 matrix is : %d - %d =  %d", a[0][0]*a[1][1], a[1][0]*a[0][1],
determinant);
   return 0;
}
```

(iv)(a) *See answer to question 4(i) June 2013.*

In a pseudo code, some terms are commonly used to represent the various actions. For example, for inputting data, the terms may be (INPUT, GET, READ), for outputting data (OUTPUT, PRINT, DISPLAY), for calculations (COMPUTE, CALCULATE), for incrementing (INCREMENT), in addition words like ADD, SUBTRACT, INITIALIZE are used for addition,
subtraction, and initialization, respectively.

(b) *Difference between Pseudocode and Source(program) code*

Source code or rather a programming language is a set of rules defined by said language which can be run on a machine.

Pseudo code is an abstract representation of the logic used in any real programming language whose job is to neatly express the logic of the code. It can’t run on a machine, but is greatly useful in documenting the logic behind a function or procedure.

If a program is a painting, then pseudo code is the rough sketch of this painting.

(c) Pseudo coding allows not only the person writing the code, but also the reader, to understand what's happening inside of the code.
Programming languages are difficult to read for most people, but pseudocode allows nonprogrammers, such as business analysts, to review the steps to confirm the proposed code matches the coding specifications. By writing the code in human language first, the programmer safeguards against leaving out an important step. Some programmers write pseudocode in a separate document, while others write directly in the programming language using comments before the actual code. This provides a handy reference during coding.

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1(i)(a) **Data Verification:** This involves checking what is on the input document matches with what is entered into the computer. Note that this does not mean that the data is correct since details on the form could be incorrect. We have two methods of data verification:

- *Double Entry:* This method of verification involves two people typing in the same data and only if the data is identical that it is accepted for further processing. The problem with this method is that two people are paid for doing the same job and also, the two people may make identical errors and so the mistake will still go unnoticed.
- *Proof Reading:* This method involves carefully checking what has been typed against what was on the original document.

(b) **Simulation:** *see answer to question 3(i)(c) June 2011*

(c) **Handshaking**: In telephone communication, handshaking is the exchange of information between two modems and the resulting agreement about which protocol to use that precedes each telephone connection. You can hear the handshaking in those crunching and other sounds when you make a dial-out call from your computer.

(d) **Videoconferencing**: *See answer to question 6(ii)(a) June 2010*

(e) **Batch Processing:** In this type of processing, inputs are not processed until a certain number have occurred or a set time has passed. Batch processing is usually fully automatic unlike real time or transaction processing which is interactive. AES SONEL billing system.

(ii) (a) *See answer to Question 7(i) June 2010*

(b) *See answer to Question 7(ii) June 2010*

(iii) *See answers to Question 3(ii)(a) & (b) June 2011*

2.(i) **System design**:
- the team work out the details of the program by breaking it down into smaller chunks.
- This includes thinking about the visual appearance and the programming behind the software.
- The team will use pseudocode and diagrams to work out how the program should go.

(ii) *Advantages of using a computer based system over a manual system.*
- **Accuracy**: Computer-based systems help collecting data with higher precision. This limits the number of errors which could be noticed in the course of manual data input.
- **Cost effectiveness**: The bank will spend less on the purchase of paper and generation of printouts for manual input. The system could generate greater output in a short time frame.

(b) – The staffs will need to be trained to use the computer based systems. In case the software requires some special skills, there will be need for the recruitment of a specialist. Thus, will let the bank spend on the payment of a new staff member.
- The staff will be more productive, since the systems will process data in real time. Thus, data will rapidly be processes to information within shorter time frames.

(c) It is advantageous in that, if the new system fails, the old system will act as a back-up.
Also, the outputs from the old and new systems can be compared to check that the new

system is running correctly.
(iii) *Virtual reality is a 3-Dimensional world created by the computer in which the user is part of. From its definition, the user is taken to a world which is not real(virtual) though close to reality, and the user has to interact with objects in this world through the use of computer systems.*

(a) – **3D glasses**: Ordinary glasses show a single image but 3D and virtual reality glasses contain polarized lenses which show two images, one per each **eye**. These images appear to give an illusion of depth which is a particular feature of CAVE environments. More advanced versions of these glasses contain head tracking systems.

- **Surround displays**: An alternative to standard desktop monitors are large projection screens. They offer not only better image quality but also a wider field of view, which makes them very attractive for VR applications.

Other devices include: Binocular Omni Oriented Monitors (BOOM), Head Mounted (Coupled) Displays (HMD), Haptic displays

(b) - *Training*: In some sectors, VR is used to train employees, especially in dangerous environments. For example, pilots use simulators in case they make a mistake, and aspiring doctors take advantage of virtual reality to avoid medical accidents.

- *Conferencing*: VR has the potential to bring digital workers together in digital meetings and conferences. There will be real-time event coverage, something like Facebook Live with VR. Rather than merely seeing the other person on a screen, you'll be able to feel as if you are in the same room with them, despite being miles away.

- *Convenience*: VR can save organizations time and money and make work more convenient. Workers won't have to travel in order to make decisions and complete projects. For example, architects from across the globe can use virtual reality to evaluate designs.

(c) - *Military*: One of the fields where virtual reality has been adopted is in the military. It has been adopted by all the three military services – air force, navy and army. VR is being put to different uses in the military. It is used to train soldiers in a simulated battlefield. This gives soldiers the opportunity to learn without the risk of being killed or injured.

- *Real estate*: VR is used to view the plan of a building. This gives a 3 dimensional image. What architects and developers do is to upload all the virtual versions of the proposed buildings on their virtual reality database and their prospective clients can view the structures from there. It is just like viewing structures that are yet to be built.

- *Cinema*; A lot of cinemas have adopted VR technology now. They distribute head mounted display units to all viewers for each movie. When the effect of this unit is combined with powerful speakers that have been scattered all over the hall or theatre, it gives serious immersion. You will be engaged and fully immersed in the movie. In fact, you will feel like you are a part of the movie.

- *Education*: VR has been adopted in education too. It improves teaching and learning. With virtual reality, a large group of students can interact with one another within a 3 dimensional environment. Instead of going on excursion to witness certain industrial processes, it can be simulated on virtual reality platforms. This enhances understanding and also makes learning fun for students.

3(i) **Bitmap (or raster) images** are stored as a series of tiny dots called pixels. Each pixel is actually a very small square that is assigned a color, and then arranged in a pattern to form the image. When you zoom in on a bitmap image you can see the individual pixels that make up that image. Bitmap graphics can be edited by erasing or changing the color of individual pixels using programs such as Adobe Photoshop, Paint shop Pro. Examples of Bitmap file formats are; JPEG(Joint Photographic Expert Group), GIF(Graphic Interchange Format), PNG (Portable Network Graphic).

Unlike bitmaps, **vector images** are not based on pixel patterns, but instead use mathematical formulas to draw lines and curves that can be combined to create an image from geometric objects such as circles and polygons. Vector images are edited by manipulating the lines and curves that make up the image using programs such as Adobe Illustrator, Corel Draw. Examples of Vector based formats are; SVG (scalable vector graphic), PICT (Macintosh Picture), CDR (Corel Draw Graphic), WMF (Windows Meta File).

(ii) *Advantages of Vector-based graphics over bitmapped graphics.*

- Vector images tend to be smaller than bitmap images. That's because a bitmap image has to store color information for each individual pixel that forms the image. A vector image just has to store the mathematical formulas that make up the image, which take up less space.

- Vector images are also more scalable than bitmap images. When a bitmap image is scaled up you begin to see the individual pixels that make up the image. This is most noticeable in the edges of the image. When a vector image is scaled up, the image is redrawn using the mathematical formula, so the resulting image is just as smooth as the original.

- Vector formats, are better for images that consist of a few areas of solid color. Examples of images that are well suited for the vector format include logos and type whereas, Bitmap formats are best for images that need to have a wide range of color gradations, such as most photographs.

(iii) *Difference between data integrity and data security*

Data security is the protection of data against unauthorized access or corruption and is necessary to ensure data integrity. **Data integrity** is a desired result of data security, but the term data integrity refers only to the validity and accuracy of data rather than the act of protecting data. In other terms, data integrity ensuring that data is sensible and reasonable (correct).

(iv) *Measures to ensure data Data Integrity:*

- *Data Validation*: Validation is an automatic computer check to ensure that the data entered is sensible and reasonable. It does not check the accuracy of data.

- *Data Verification:* Verification is performed to ensure that the data entered exactly matches the original source.

- *Data Backup*: Backup is the process of making copies of data which may be used to restore the original data after a data loss event.

Measures to ensure data security

- making regular backups of files (backup copies should be stored in fireproof safes or in another building)
- protecting yourself against viruses by running anti-virus software
- using a system of passwords so that access to data is restricted
- safe storage of important files stored on removable disks, eg locked away in a fireproof and waterproof safe
- allowing only authorized staff into certain computer areas, eg by controlling entry to these areas by means of ID cards or magnetic swipe cards
- always logging off or turning terminals off and if possible locking them
- avoiding accidental deletion of files by write-protecting disks
- using data encryption techniques to code data so that it makes no apparent sense

---

4(i) A pseudocode is an outline of a computer program, written in a mixture of a programming language and English. Writing pseudo code is one of the best ways to represent an algorithm as it allows the programmer to concentrate on how the program works while ignoring the details of the language.

(ii) *Algorithm development concepts:*

(a) **Stepwise refinement**: Stepwise refinement is the process of breaking a problem down through successive steps into smaller problems. It is an iterative process where each problem is decomposed and refined step by step. *Read more on Chapter 14, Fundamentals of ICT for Cameroon Secondary schools.*

(b) **Top-down design**: Top-down design is the process of designing a solution to a problem by systematically breaking the problem into smaller, more manageable parts. The problem is broken down into smaller problems called sub-problems, which in turn are broken into smaller sub-problems, continuing until each sub-problem can be solved in a few steps. *Read more on Chapter 14, Fundamentals of ICT for Cameroon Secondary schools.*

(iii) *Programming tools:*
(a) **Compiler:** A compiler translates the entire high-level program into a machine language program. The high level language program is called *source program or source code* and the generated machine language program is called object program or object code. This process is called *compilation*.

(b) **Interpreter**: An interpreter translates code into machine code, instruction by instruction - the CPU executes each instruction before the interpreter moves on to translate the next instruction. Interpreted code will show an error as soon as it hits a problem, so it is easier to debug than compiled code. *Read more on Chapter 13, Fundamentals of ICT for Cameroon Secondary schools.*

(iv)(a) **Repeat-until (or Do-while) Statement**

Syntax:
```
do {
        statements to be executed;
          } while(expression);
```

(b) **While Statement**

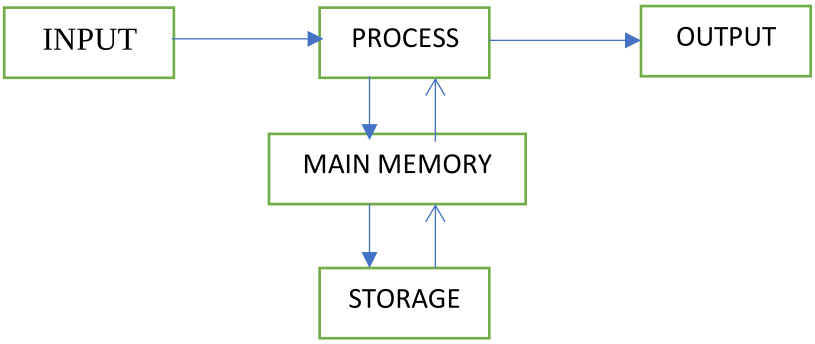
Syntax:
```
while (condition)
     {
       statements;
       }
```

(c) **For statement**

Syntax:
```
for (initialization; termination; increment/decrement;)
   {
       statements to be executed;
    }
```

More information on how these looping constructs is found in Fundamentals of ICT for Cameroon Secondary Schools, Chapter 13.

5(i)(a)



(b) – *Input*: Keyboard, Mouse, Microphone
- *Output*: Monitor, speaker, projector
- *Process*: Processor (AMD or Intel), Graphic Processing Unit(GPU)
- *Main memory*: RAM, Cache Memory
- *Storage*: CD ROM, DVD, Hard disk drives, Solid State Drives(SSD)

(ii) From the Block diagram, a computer is a device which receives a set of input, processes it to generate an output. The processed input can be kept temporally in the Main memory or permanently in the storage.

(iii) Two blocks involved in the machine cycle are the Central Processing Unit (Control Unit and Arithmetic Logic Unit)

(iv) stages involved in the machine cycle involve: Fetch, Decode, Interpret, Store

(v) *Volatility* is a characteristic of a storage medium. In most cases, when a memory is referred to as volatile, it means the memory losses its content when the device is off charge i.e when the device is powered off, it loses its content. An example of a volatile memory is the Random Access Memory (RAM)

6(i) *Differences between System Software and Application Software*

System Software	**Application Software**
System software is used for operating computer hardware.	Application software is used by user to perform specific task.
System softwares are installed on the computer when operating system is installed.	Application softwares are installed according to user's requirements.
In general, the user does not interact with system software because it works in the background.	In general, the user interacts with application sofwares.
System software can run independently. It provides platform for running application softwares.	Application software can't run independently. They can't run without the presence of system software.
Some examples of system softwares are compiler, assembler, debugger, driver, etc.	Some examples of application softwares are word processor, web browser, media player, etc.

(ii) Types of System Software
- *Device driver*: Enables device communication with the OS and other programs.
- *Firmware/BIOS:* Enables device control and identification.
- *Language Translator*: Translates high-level languages to low-level machine codes.
- *Utility*: Ensures optimum functionality of devices and applications.

(iii)(a) Word processing Software
(b) Spreadsheet software
(c) Database Software
(d) Desktop Publishing software

(iv)(a) – *Computer Virus*; A virus is a computer program that can copy itself and infect a computer where it destroys files and disrupts the operation of the computer.

- *Computer Antivirus*: A software which detects, quarantines and deletes computer viruses.

(b)- *Trojan Horse*: A Trojan horse is malware that appears to perform a desirable function for the user prior to run or install but instead facilitates unauthorized access of the user's computer system.

- *Worm*: A worm is a self-replicating malicious program which uses a computer network to send copies of itself to other computers (nodes) on the network and it may do so without any user intervention.

- *Boot Sector Virus*: It is a type of virus that infects the boot sector of floppy disks or the Master Boot Record (MBR) of hard disks (some infect the boot sector of the hard disk instead of the MBR). A boot sector cannot infect a computer if it is introduced after the machine is running the operating system. An example of a boot sector virus is Parity Boot.

Bonus: *A **boot sector** is a region of a hard disk, floppy disk, optical disc, or other data storage device that contains machine code to be loaded into random-access memory (RAM) by a computer system's built-in firmware.*

7(i)(a) **Patient Record system**: It helps health practitioners access quickly a list of current problems, a trail of clinical logic, the patient's health status, and the most recent information about various treatment options for the patient's condition.

(b) **Payroll system**: Computers are used in managing employee records and payroll since companies employ many workers. Payroll processing is made easy as automatic calculations can be made for several employees at a given time.

(iii) There are several things to be taken into consideration when designing a User interface. Some of which are; usefulness, usability, accessibility, desirability, accessibility. No matter what group of individuals is concerned which the factors apply for everyone, I will briefly explain the most important.

- *Usability*: Usability is concerned with enabling users to effectively and efficiently achieve their end objective with a product. A computer game which requires 3 sets of control pads is unlikely to be usable as people, for the time being at least, only tend to have 2 hands.

- *Findability*: Findable refers to the idea that the product must be easy to find and in the instance of digital and information products; the content within them must be easy to find too. If you cannot find a product, you’re not going to buy it and that is true for all potential users of that product.

- *Accessibility:* Accessibility is about providing an experience which can be accessed by users of a full range of abilities – this includes those who are disabled in some respect such as hearing loss, impaired vision, motion impaired or learning impaired.

(iii)(a) *Convert 4301_8 to binary*

Conversion from Octal system to binary involves providing the binary representative of every octal digit in three(3) bits.

4	3	0	1
100	011	000	001

The binary number is 100011000001_2

(b) Evaluate 101_2 x 11_2

Binary multiplication follows the same procedure like decimal multiplication.

```
   101
  x  11
-----------
   101
+ 101
-----------
  1111
```

8(i)(a) *See answer to question 8(i)(a), June 2011.*
(b) *See answer to question 8(i)(b), June 2011.*
(c) *See Answer to question 8(i)(b), June 2011*

(ii)(a) A **programming language** is a set of predefined words, symbols and rules that are used to write computer programs.

(b) A **low-level language** is a language whose instruction set reflects the processor architecture. An instruction set is the set of bit patterns or binary codes for the machine operations that a processor has been designed to perform. Low-level languages include machine language and assembly language.

High-level languages are closer to human language. They allow programmers to write programs without having to understand the inner workings of the computer. One high-level language statement will generally be translated into several low-level language statements. They are the third generation of programming languages. Examples are C, BASIC (Beginner's All-purpose Symbolic Instruction Code), Pascal, Java, FORTRAN (Formula Translator) and COBOL (Common Business-Oriented Language).

(iii)(a) **Portability***:* Portability is a characteristic attributed to a computer program if it can be used in an operating systems other than the one in which it was created without requiring major rework.

Porting is the task of doing any work necessary to make the computer program run in the new environment.

(b) **Algorithm:** An algorithm is a well-defined set of step-by-step instructions for solving a problem in a finite amount of time. *A set of instructions is not an algorithm if there is no definite stopping place, or if the instructions are too vague to be followed clearly*

(c) **Control Structure:** Control structures specify the statements to be executed and their order of execution. *Read Chapter 13, Fundamentals of ICT for Cameroon Secondary Schools.*

9(i)(a) **Internetworking:** The process or technique of connecting individual local-area networks (LANs) to create wide-area networks (WANs) , and connecting WANs to form even larger WANs. Internetworking can be extremely complex because it generally involves connecting networks that use different protocols. Internetworking is accomplished with routers, bridges, and gateways.

The **Internet** is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet.7

(b) – **Intranet**: An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the wide area network. The main purpose of an intranet is to share company information and computing resources among employees.

- Extranet: An extranet is a controlled private network allowing customers, partners, vendors, suppliers and other businesses to gain information, typically about a specific company or educational institution, and do so without granting access to the organization's entire network. An extranet is often a private part of a website.

(c) **Search Engine**: Search engine is a service that allows Internet users to search for content via the World Wide Web (WWW). A user enters keywords or key phrases into a search engine and receives a list of Web content results in the form of websites, images, videos or other online data. Examples of Search Engines include; Google, MSN, Yahoo.

The list of content returned via a search engine to a user is known as a search engine results page (SERP).

(ii)(a) **Switch:** A switch is a device that provides a central connection point for cables from different workstations or computers, servers or other peripheral devices which can connect to a network. In a star topology, each node is connected to a central switch/hub using a twisted-pair wire. A switch memorises the addresses of computers and forward the information directly to the correct destination.

(b) **Repeater**: A repeater is an electronic device that receives a network signal, cleans it of unnecessary noise, and regenerates it. The signal is retransmitted at a higher power level, or to the other side of an obstruction, so that the signal can cover longer distances without degradation.

(c) **Router:** A router is a network device that translates information from one network to another. Depending on the origin and destination of information, a router will select the best route for the information to take. Routers have the ability to redirect information to other routes to prevent head-on collisions.

(d) **Multiplexer and Demultiplexer**: A multiplexer is a communication device that allows a number of computing devices to share the same communication line. Multiplexing is a technique of transmitting data efficiently by combining several low-speed signals into one high-speed signal on a single communication line. At the receiving end, the multiplexed signal is separated (de multiplexed) into the original input signal. This is done by a demultiplexer.

CGCEB JUNE 2014

1(i)(a) **Automated Speech Recognition**: is the use of computer hardware and software-based techniques to identify and process human voice. It is used to identify the words a person has spoken or to authenticate the identity of the person speaking into the system. It also known as Automatic Voice recognition (AVR), Voice-to-text or speech recognition.

(b) *Advantages and Limitations of Speech Recognition*.

Advantages:

- *Access* – for writers with physical disabilities that prevent them from using a keyboard and mouse, being able to issue voice commands and dictate words into a text document is a significant advantage.
- *Spelling* – you will have access to the same editing tools as a standard word processing solution. Of course, nothing is 100 percent accurate (yet), but the software will catch the majority of spelling and grammatical errors.
- *Speed* – the software can capture your speech at a faster rate than you might normally type. So it is now possible to get your thoughts onto electronic paper faster than waiting for your fingers to catch up.
- *Specialization* – Voice Command Technology (VCT) has demonstrated considerable growth in the medical sector. For example, the physicians find it very helpful to make file notations directly into the patient’s Electronic Health Record (EHR). It’s designed to have a built-in comprehensive medical vocabulary.

Disadvantages:

- *Set-up and Training* can be a significant investment of time. Despite promises that you’ll be up and running in a few minutes after installation, the reality of recording your voice commands is more complex. Capturing your tone and inflection accurately sometimes takes time. Even the software takes a pause at few sentences, as it tries to figure out what you said. Therefore, it all requires patience and clear enunciation.
- *Frequent Pauses* can at times spoil your mood. Remember that the goal was to write faster than you could normally type. Changes in voice tone or speech clarity can cause glitches, as an unrecognized words or acronyms.
- *Limited Vocabulary* – you should also be ready for lots of delays while the software stumbles on your strange words. The simple reason for this is, new industry-specific vocabularies are being added all the time these days.

(ii)(a) **Magnetic STRIP**: A magnetic stripe is a thin band of magnetic tape. It is often on the back of a credit or debit card, identity cards and electronic key cards in hotels and businesses. Magnetic stripes can hold only a small amount of data and are quite easy to forge. Magnetic stripes are gradually replaced with smart cards which store much more data on a small microchip built into the surface of the card

(b) **Magnetic Ink Character Recognition:** MICR uses an input device called a magnetic ink character reader to input characters that have been printed in special magnetic ink. Banks use MICR to process cheques; Banks use this method of input for processing cheques because it is very secure. The equipment needed to print and read characters in magnetic ink is very expensive.

(c) **Touchpad:** A touch pad is a device for pointing (controlling input positioning) on a computer display screen. It is an alternative to the *mouse*. Originally incorporated in laptop computers, touch pads are also being made for use with desktop computers. A touch pad works by sensing the user's finger movement and downward pressure.

(iii)(a) *Difference between data validation and Data verification*

Data Validation is an automatic computer check to ensure that the data entered is sensible and reasonable. It does not check the accuracy of data, whereas *Data Verification* is method performed to ensure that the data entered exactly matches the original source.

(b) – **Proofreading**: this method involves someone checking the data entered against the original document. This is also time-consuming and costly.

- Double Entry: this method involves someone checking the data entered against the original document. This is also time-consuming and costly.

(c) *Application of Double entry method:*

Double-entry bookkeeping, in accounting, is a system of bookkeeping so named because every entry to an account requires a corresponding and opposite entry to a different account. The double entry has two equal and corresponding sides known as *debit* and *credit*. When there is a value difference between debits and credits, it indicates a recording error. This method in accounting, provides a complete record of financial transactions for a business.

2(i)(a) **LIFO:** Last In First Out; it is a principle(algorithm) in which items are added and removed from the same end (head). Items being added and removed from the same end means that the last item to be added will be the first to be removed. They are also called **stacks**. Some applications of stacks are; converting a decimal number to Binary, evaluating arithmetic expressions. *Read more on chapter 13, Fundamentals of ICT for Cameroon Secondary Schools*

(b) **FIFO**: First In First Out; It is a principle (algorithm) in which items are inserted to one end (tail/rear) and removed from the other end (head/front) such that the first item added to the list is the first to be removed. They are also called Queues. Some applications of this principles are; Spooling, Scheduling. *Read more on chapter 13, Fundamentals of ICT for Cameroon Secondary Schools*.

(ii)(a) **Source Code**: Source code is the set of instructions and statements written by a programmer using a computer programming language. This code is later translated into machine language by a compiler. The translated code is referred to as object code. The source code is the source of the computer program.

(b) The classification of programming languages as high languages can be seen on two perspectives; the first which is, the language is a distance away from the hardware. In this case, for the instructions to be carried out by the hardware, there is need for an intermediary(software) which will receive the instructions and change it to the machine language.

Secondly, it is a language which permits computer programmers easily understand one another and put their thoughts to writing for better programming. This came about because the study of machine language was practically difficult, thus the need of creating a programming language arose, which enabled computer users to easily understand and create many more programs fast, within a short time frame.

(c) *Algorithms can be represented in two ways: Pseudocode and Flowcharts*

(d) *From the definition of algorithms (see answer to question 8(iii)(b) June 2013), comparing algorithms will be based on its qualities. This is so because, algorithms remain an approach to solving a problem, i.e algorithms are not solutions to problems. Below are some qualities of good algorithms;*
- They should be explicit (i.e. clear and obvious)
- they should be precise (i.e. exact and accurate)
- they should be unambiguous (i.e. no doubts about what to do/ only one way of interpreting the instructions)
- They should be effective (i.e. produce good results)
- They should be finite (i.e. have a definite stopping place)

(iii)(a) **Artificial Intelligence**: This is the ability of a machine or a computer program to think and learn. It provides machines with the ability to improve experience without being explicitly programmed.
(b) **Computer Aided Design (CAD)**: Computer-aided design (CAD) is the use of computer technology in the design process. A CAD software package allows a designer to create technical drawings and schematics which can be 2-dimensional or 3-dimensional. An Architect, civil engineer, Software engineer, Electrical and electronic Engineer are professionals who use CAD. The benefit of CAD software packages is their ability to provide a digital prototype of the product at early stages of the design process, which can be used for testing and evaluation.

3(i)(a) **Relational Database**: Relational databases allow data to be separated and connected across several tables. Tables are connected through primary and foreign keys to increase efficiency.
A single flat-file table is useful for recording a limited amount of data. But a large flat-file database can be inefficient as it takes up more space and memory than a relational database. It also requires new data to be added every time you enter a new record, whereas a relational database does not.
(b) **Database Management System**: A database management system (DBMS) is a tool to store, edit and organize data in a database. It provides several key features: stores data in one central location, allows data to be shared by many users.
(c) **Redundancy in a database**: Data redundancy is a condition created within a database in which the same piece of data is held in two separate places. This can mean two different fields within a single database, or two different spots in multiple software environments or platforms.
(ii) *Advantage of DBMS*
The DBMS helps to create an environment in which end users have better access to more and better-managed data. Such access makes it possible for end users to respond quickly to changes in their environment.
Disadvantage of DBMS
Increased Cost; Database systems require sophisticated hardware and software and highly skilled personnel.
(iii)(a) *See answer to question 3(i)(b) June 2011*
(b) *See answer to question 3(i)(d) June 2011*
(c)*See answer to question 6(i)(a) June 2010*

4.(i)(a) *See answer to question 3(ii)(b) June 2010*
(b) **RAM chip**: is the device which fits into the RAM slot on the Motherboard. It’s a primary storage device and its primary role is to hold information actively been accessed by the CPU.
(c) **Ethernet Card**: Also referred to as Network interface card. *See answer to question 3(ii)(b) June 2010*
(ii)(a) *See answer to question 3(i)(c) June 2011*
(b) *See answer to question 1(i)(d) June 2013*
(c) *See answer to question 3(i)(c) June 2012*

(iii)(a) *See answer to question 3(i)(a) June 2010. For the advices, see computer health hazards and possible ways to remedy them on question 1(i) & (ii) June 2011*

(b) Advantages of LCD over CRT

- Liquid Crystal Display (LCD) screens occupies less space compared to Cathode Ray Tubes.
- LCD screens consumes less energy compared to CRT. LCD dissipates little or no radiation, whereas CRT emits radiation which is dangerous to the health.
- LCD screens have greater resolutions compared to CRT, thus the quality of images on LCD screens are great compared to CRT.
- LCD screens are portable, they can be carried from one place to another without much efforts, whereas CRT occupies much space and are heavy, making them hard to displace form one place to another.

5(i)(a) RAM stands for Random Access Memory. It is commonly referred to as the working space of the computer. It's main role is to hold data which is actively been processed by the CPU.

(b) *Machine cycle is also referred to as the Instruction Cycle. Once the necessary data and instructions are in memory, the central processing unit performs the following four steps for each instruction:*

- The control unit **fetches** (gets) data and instructions from memory.
- The control unit **decodes** the instructions i.e. determines what they mean, and directs that the necessary data be moved to the arithmetic-logic unit.
- The arithmetic-logic unit then **executes** the instruction on the data. That is, the ALU is given control and performs the actual operation on the data.
- The arithmetic-logic unit stores the result of this operation in memory or in a register.

(ii)(a) **Word size**: Word size refers to the maximum number of bits that a CPU can process at a time. These days, typically 32 bits or 64 bits. Data bus size, instruction size, address size are usually multiples of the word size.

(b) **Byte**: A byte is the smallest addressable unit of the computer and it is used to represent a character. Each character, be it a letter, a digit or a symbol is represented as an eight bits pattern. The word "data" has 4 characters, meaning that it will take up 4 bytes which is 32 bits.

(c) **ASCII Code**: ASCII stands for American Standard code for information Interchange. It is the most common format for text files in computers and on the internet. In an ASCII file, each alphabet, numeric or special character os represented with a 7-binary number (a string of seven 0s and 1s).

(iii) *Components of the CPU*

- **Arithmetic Logic Unit:** An arithmetic logic unit is a digital circuit used in computers to perform arithmetic and logic operation.
- **Control Unit**: A control unit is circuitry that directs operations within a computer's processor
- **Registers/Memory Unit.** Registers are temporary storage areas which are responsible for holding the data that is to be processed. They store the instructions and data in a processor. This data is further used by Control Unit. There are some registers that are set aside for specific tasks, these generally include a program counter, stack, and flags.
- **Cache Memory (Level 1):** Cache memory is a smaller and faster memory between the CPU and main memory, which stores copies of data from the most frequently accessed memory locations. The purpose of cache memory is to speed up accesses by storing recently used data closer to the CPU, instead of storing it in main memory.
- **System Bus**: A computer bus is a set of parallel lines that interconnects various components inside the computer, allowing the exchange of data between them. It is the pathway between these components, enabling data to be transferred from one component to another.

6(i)(a) **Web Page**: A web page is a text file that contains information stored using a structured language called HTML (Hypertext Markup Language). A website consists of a number of web pages connected by hypertext links.

(b) *See answer to question 9(i)(c) June 2013*

(c) A **web browser** (or simply browser) is a computer program that enables a user to read hypertext in files or on the World Wide Web. Popular browsers include Mozilla Firefox Microsoft Internet Explorer, Opera Mini and Netscape.

(iii)(a) *Impacts of computer Viruses to educational Institution*

- *Changing files*: Another main effect of computer viruses is the modification of files on a hard drive or other writable media. Seeing new and unknown files, folders or applications appear on a computer's hard drive is one possible sign of a computer virus. Another possible effect is the modification of files.

- *Surprising Behavior*: Another possible effect of computer viruses is random and surprising behavior. A computer's mouse pointer may start to jump around the screen or stop responding.

- *Computer Speed*: One of the classic primary signs that a computer has a virus is that it suddenly becomes much less responsive than normal. This usually continues after rebooting the computer as the malicious software begins running again and using system resources.

(b) – Avoid downloading attachments from mails which you don't expect.
- Install an Antivirus Software. Apply appropriate patches to the software where necessary and update the virus signature database.
- Don't visit untrusted websites.
- Beware of removal media devices you plug to your computer system. Always run a scan of such devices and make sure they are clean off Computer viruses before you start using them.

(c) *This question sounds generic compared to the question in (a) above. The effect and impact are similar. The results of computer virus to whatsoever system are adverse. Check the answer in (a) above.*

(iii)(a) **Multimedia** means that computer information can be represented through audio, video, and animation in addition to traditional media (i.e., text, graphics drawings, images).

(b) *Impacts of the installation of Multimedia centers in Cameroon*

The impacts of multimedia centers can also be regarded as the impact of E- learning, Computer Assisted Learning to an economy.

- *Offers access to Updated Content*: A prime benefit of learning through computer systems(online) is that it makes sure that you are in synchronization with modern learners. This enables the learner to access updated content whenever they want it.
- *Quick Delivery of Lessons:* eLearning is a way to provide quick delivery of lessons. As compared to traditional classroom teaching method, this mode has relatively quick delivery cycles. This indicates that the time required to learn is reduced to 25%-60% of what is required in traditional learning.
- *Lectures can be taken any number of Times:* Unlike classroom teaching, with online learning you can access the content an unlimited number of times. This is especially required at the time of revision when preparing for an exam. In traditional form of learning, if you cannot attend the lecture, then you have to prepare for that topic on your own; in eLearning, you can attend the lectures whenever you want with ease.
- *Reduced Costs:* eLearning is cost effective as compared to traditional forms of learning. The reason for this price reduction is because learning through this mode happens quickly and easily. A lot of training time is reduced with respect to trainers, travel, course materials, and accommodation.

7(i)(a) **Computer Ethics:** The term ethics refers to the standard of moral conduct, i.e. the bad and good of any act carried out by a human being. Computer ethics is the standard of good conduct associated with the use of computers. It deals with the judgement of computing acts whether they are good or bad. Computer ethics came into existence because many computer users use the computer to carry out acts which are unethical. Such an act is called computer abuse.

(b) **Hacking**: Hacking is the unauthorised access to data held on a computer system. The individual who tries to get this access is known as a hacker. Hackers are very knowledgeable computer users who use their knowledge to gain access into other people's system. Hackers are responsible for the spread of viruses through the internet and other computer networks.

(c) **Copyright**: is a legal concept, giving the creator of original work exclusive rights to control its distribution for a certain time period. Something that is copyrighted is not to be reproduced, published or copied without permission from the copyright holder. Ideas are not protected by copyright; only the specific presentation of the idea is copyrightable.

(ii)(a) *Differences between Copy-Paste action and Cut-paste action*

- *Definition*: Cut and Paste is an option that allows the user to remove content from the document and place it in some other location of the same document or in a different document. On the other hand, the Copy Paste is an option that allows the user to place content into a new location without affecting the original content.
- *Original Content*: The Cut Paste will remove the original content from the document but Copy Paste will not remove the original content from the document.
- *Keyboard Shortcuts*: In Cut Paste, to cut, the user should press ctrl and X keys together in the keyboard and to paste, the user should press ctrl and V keys together. In Copy Paste, to perform copy, the user should press ctrl and C keys together in the keyboard and, for paste, ctrl and V keys together.

(b) *Difference between word Art and Clip Art*

- **Clip Art** can be anything from a piece of stock photography, drawings or movie. These can be used to illustrate a point or concept in your documents. **Word art** enables you to create amazing and unique word art with ease.
- ClipArt is animated pictures and WordArt is like animated words.

(iii) (a) Spreadsheet Software
(b) Spreadsheet software
(c) Presentation Software
(d) Desktop Publishing software

(iv)(a) Difference between Parallel and Serial Transmission

Basis for comparison	**Serial transmission**	**Parallel transmission**
Meaning	Data flows in bi-direction, bit by bit	Multiple lines are used to send data i.e. 8 bits or 1 byte at a time
Cost	Economical	Expensive
Bits transferred at 1 clock pulse	1 bit	8 bits or 1 byte
Speed	Slow	Fast
Applications	Used for long distance communication. Eg, Computer to computer	Short distance. Eg, computer to printer

(b) *Difference between Simplex and Full-duplex transmission*
For revision purposes, Half Duplex mode was included here for better understanding and appreciation.

Basis for comparison	**Simplex**	**Half duplex**	**Full duplex**
Direction of Communication	Communication is unidirectional.	Communication is two-directional but, one at a time.	Communication is two directional and done simultaneously.
Send/Receive	A sender can send data but, cannot receive.	A sender can send as well as receive the data but one at a time.	A sender can send as well as receive the data simultaneously.

Basis for comparison	Simplex	Half duplex	Full duplex
Performance	The half-duplex and full duplex yields better performance than the Simplex.	The full duplex mode yields higher performance than half duplex.	Full duplex has better performance as it doubles the utilization of bandwidth.
Example	Keyboard and monitor.	Walkie-Talkies.	Telephone.

(c) *Difference between Synchronous and Asynchronous Transmission*

Basis for comparison	Synchronous transmission	Asynchronous transmission
Meaning	Sends data in the form of blocks or frames	Sends 1 byte or character at a time
Transmission Speed	Fast	Slow
Cost	Expensive	Economical
Time Interval	Constant	Random
Gap between the data	Absent	Present
Examples	Chat Rooms, Video Conferencing, Telephonic Conversations, etc	Letters, emails, forums, etc

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8(i)(a) *See answer to Question 4(i) June 2013*
(b) *Below are some qualities of good algorithms;*
- They should be explicit (i.e. clear and obvious)
- they should be precise (i.e. exact and accurate)
- they should be unambiguous (i.e. no doubts about what to do/ only one way of interpreting the instructions)
- They should be effective (i.e. produce good results)
- They should be finite (i.e. have a definite stopping place)

(ii)(a) **Fault Tolerance**: The ability of a system to respond gracefully to an unexpected hardware or software failure. There are many levels of fault tolerance, the lowest being the ability to continue operation in the event of a power failure. Many fault-tolerant computer systems *mirror* all operations -- that is, every operation is performed on two or more duplicate systems, so if one fails the other can take over. *In more common terms, its name speaks for itself, if the device can tolerate fault, this means it can operate even in the presence of an error or fault.*
(b) Repeater. *See definition on question 9(ii)(b) June 2013*
(c)- *Signal coalition is not common in ring*: This is because for a device to transmit in a ring topology, there is need for an empty token. Once this token is used by one node, no other neighboring node can transmit at that time, they can only receive. With this method, signal coalition is practically impossible.
- *Mesh offers the greatest fault tolerances:* This is true, because one computer is connected to two or three others in the network. If a node or transmission line gets bad during transmission, data transmission

continues because there are several routes through which the source (sender) can reach the destination (receiver)

- *Security is more assured in a star than in a bus*: In a star topology, the central node supervises transmission in the network. For two devices to communicate, they must use the central node, this helps avoid data coalition. In a star topology, one node can communicate directly with the destination computer without any other computer receiving the content, as opposed to bus topology.
- *A ring offers more fault tolerance than a star*: This is possible because the failure of a device doesn't stop transmission in the network. In addition to that, no device has monopoly over transmission as opposed to star topology in which failure of the central node, disrupts the entire network transmission.

(iii)(a) **.PDF**: Stands for Portable Document Format, enables computer users to open, review and print documents saved in it.

(b)**.MPEG**: Moving Picture Experts Group, used to store video and audio, but it can also be used to store other data such as subtitles and still images.

9(i)(a) *Convert* 34_{10} *to Binary*

We will proceed by repeated division method.

34/2 = 17 R 0 (*Least Significant Bit, LSD*)
17/2 = 8 R 1
8/2 = 4 R 0
4/2 = 2 R 0
2/2 = 1 R 0
1/2 = 0 R 1 (*Most significant Bit, MSB*)

Therefore 34_{10} to Binary is 100010_2

(b) 10110101_2
- 11111_2
------------
10010110_2

(c) 101101
x 101
---------
101101
000000
101101
------------
11100001

(ii) (a) *See answer to question 8(i)(a) June 2011*

(b) *See question 2(ii)(b) June 2011*

(iii)(a) *The operating system is often installed before any other software.*

– Operating is the first software required for the computer to become operation

- Operating is the software which manages other software installed on the computer system. Hence it provides a platform for other softwares, like your browser to run.
- Operating system managing all I/O devices connected to the computer system

Without an operating system your laptop is just a box of bits that do not know how to communicate with one another, or you

(b) *People prefer working with graphical user interface than command line interface.*

Offers the advantages of an interface. It is easier to use for a typical user, it can provide feedback more effectively as the program runs, and can respond to interaction on the fly. A **non-**graphical interface typically means the interface is textual.

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1(i)(a) *See answer to Question 1(iii)(b) June 2011*

(b) *Measures that can be taken to secure a banking system.*

It will be good to note that banks are one of the Institutions which keep much personal data and security of such data is of paramount importance. Hence we should emphasize more on the authentication techniques and avoid some computer crimes to the minimum. Some of the measures are as follows;

- **Passwords**: A password is a secret sequence of characters that is required to login to a system, thus preventing unauthorized persons from gaining access to the system. When authentication is done through the use of a password, knowledge of the password is assumed to guarantee that the user is authentic.

- **Smart Card:** A smart card is a small card that holds user authentication information. When the card is inserted into a card reader, electrical fingers wipe against the card. The information in the card is read and used to authenticate the person.

- **Encryption**: It is the process of transforming a message using an algorithm into a form unreadable by anyone except the intended recipient.

- **Biometrics**: Biometrics refers to the use of measurable biological characteristics such as fingerprints, eye retinas, iris patterns, facial patterns, voice patterns, hand measurements and DNA, to identify a person.

- **Firewall**: A firewall is a system designed to prevent unauthorized access to or from a private network. Firewalls are implemented in either hardware or software form, or a combination of both. They prevent unauthorized Internet users from accessing private networks connected to the Internet.

- **Intrusion Detection:** Intrusion detection is the art and science of sensing when a system or network is being used inappropriately or without authorization. An intrusion-detection system (IDS) monitors system and network resources and activities and, using information gathered from these sources, notifies the authorities when it identifies a possible intrusion.

(ii)(a) *In this question we are asked to describe what a DBMS. The word describe simple asks us to say what a DBMS is. In other words, the question could be phrased as such, "what is a DBMS?"*
See answer to question 1(i)(c) June 2010

(b) *See answer to question 3(i)(a) June 2014*

(c) *Examples of a flat file in database;* A **flat file** database stores data in plain text format. In a relational database, a flat file includes a table with one record per line. The different columns in a record are delimited by a comma or tab to separate the fields. Flat files are widely used in data warehousing projects to import data.

Bonus: Examples of software that can create flat file databases include Microsoft Excel, Microsoft Access, FileMaker or FileMaker Pro, Berkeley DB, and Borland Reflex

(iii)(a) **Programming paradigm**: A programming paradigm (or technique) is a fundamental style of computer programming. It describes a programming language's approach to solving a problem. Paradigms differ in the concepts and abstractions used to represent the elements of a program and the steps that compose a computation.

(b) – **Procedural Programming Paradigm**: In the procedural/imperative paradigm, a program is a collection of statements and procedures that affect data. Here, a program can be seen as an active agent that manipulates passive objects(variables).These objects are passive because they cannot initiate an action by themselves, but can only receive actions from active agents. Examples of imperative languages are Pascal, C, Ada, FORTRAN, and COBOL.

- **Declarative Programming Paradigm**: In declarative (logic) programming, a program is a collection of facts and rules involving relational expressions. Declarative paradigm uses the principle of logical reasoning to answer queries. An example of a declarative programming language is PROLOG (programming logic).

Bonus; Read more of this topic on Chapter 13 of Fundamentals of ICT for Cameroon Secondary Schools.

2.(i)(a) *See answer to question 9(ii) June 2011*

(b) *Topology refers to physical arrangements, so if a school thinks of selecting a topology, they need to think of the scope of the network, and resources they need to share.*

- In the scope of the network, the school needs to think about the mode of transmission, is it unicast or multicast.

- During transmission does one computer send and all others receive (bus) or there is need for a device which will supervise transmission of data (star topology).

(ii)(a) Prototyping is the rapid development and testing of a working model of a product in an interactive and iterative process involving both systems analysts and end users. This working model or prototype, is a partially developed product that enables customers and developers to examine some aspects of the proposed product and decide if it is suitable for a finished product.

(b) - *Evaluating and Testing the Design:* Unfortunately, ideas and drawings of a design can sometimes be a far cry from the real world in which the product will be used. By creating a prototype, it is possible to sit down with a real version of the product and determine which aspects are worthwhile and which parts need to be revised or discarded.

- *Clarifying Production Costs and Issues:* By prototyping before production begins, it is possible to take a glimpse at the production process and see if any steps can be changed, combined or even removed. This not only streamlines production, but keeps the cost of the actual production to a minimum.

- *Selling the Product to Others*: Just like it is far easier to see if there are any problems with a design by holding an actual working model, it is also far easier to sell to potential customers when they have a prototype to hold and manipulate at a marketing presentation.

(iii)(a) *See answer to question 8(iii)(c) June 2013*

(b) - **Sequence Control Structure**

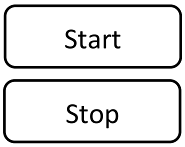
Syntax: IF condition THEN

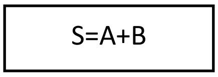
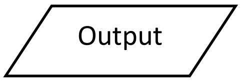
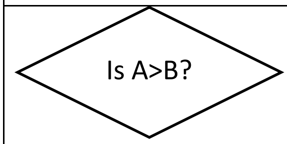
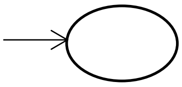
```
Syntax: IF condition THEN
                Statement
        ELSE
                Statement
```

- **FOR Statement**; *See answer to Question 4(iv)(c) June 2014*

- **WHILE Statement:** *See answer to Question 4(iv)(b) June 2014*

(c) *Flow chart symbols*

	Terminator	**Terminator** symbols mark the start or end of a procedure. Only one flow line leaves the terminator

 Processing	A **rectangle** box may represent a single step (action or procedure) or an entire sub procedure within a larger procedure.
 Input/output	A **parallelogram** (slanting rectangle) represents data or information entering or leaving a stage.
 Decision	A **rhombus** indicates a choice or decision.
 Connector	A **circle** is used to connect two flow charts or algorithms where they have a common label.
	An **arrow** indicates the order in which subtasks are carried out.

3(i)(a) *See answer to question 8(i)(b) June 2013*

(b) In **Direct implementation**, the system is implemented and tested to ensure it performs properly. Then the old system is removed and the new one put in its place without any overlap or limited roll out. While in **piecemeal implementation** (phase implementation) The new system is installed in phases (stages or steps) gradually replacing parts of the old system until eventually, the new system takes over.

(c) There are several alternatives of implementing a project; Parallel implementation, pilot implementation. *Read more on chapter 14 of Fundamentals of Cameroon secondary schools*.

(ii) (a) – A project manager is responsible for developing and managing technology projects and their cost, time and scope.

- A Project manager is a person who has the overall responsibility for the successful initiation, planning, design, execution, monitoring, controlling and closure of a project.

(b) **PERT** (Program Evaluation Review Technique) is an event-oriented network analysis technique used to estimate project duration when there is a high degree of uncertainty with the individual activity duration estimates Each activity is assigned three time estimates;

m= most likely time estimate, (mode)
a = optimistic time estimate (best case)
b = pessimistic time estimate (worst case)

These three estimates are then used to calculate a weighted duration for each task by using the Formula

$T_E = \frac{(a + 4m + b)}{6}$

(c) The **critical path** determines the earliest possible completion date of the project

(iii) This question aims at knowing the impact of ICT on people. So we are to give those impacts on people who have limited or no access to ICT;

- *Little or No access to Information:* Possibly the greatest effect of ICT on individuals is the huge increase in access to information and services that has accompanied the growth of the Internet. Some of the positive aspects of this increased access are better, and often cheaper, communications, such as VoIP phone and Instant Messaging. In addition, the use of ICT to access information has brought new opportunities for leisure and entertainment, the facility to make contacts and form relationships with people around the world, and the ability to obtain goods and services from a wider range of suppliers. Hence people having little or no access to ICT won't benefit such facilities.

- *little or No improvement in education:* distance learning and on-line tutorials. New ways of learning, e.g. interactive multi-media and virtual reality. New job opportunities, e.g. flexible and mobile working, virtual offices and jobs in the communications industry. Hence people having little or no access to ICT won't benefit such facilities.

4(i)(a) **File format** is a particular way that data is encoded for storage in a computer file. Examples are .docx (document file), .xls (Excel worksheet file).

(b) The file format helps an operating system, like Windows or macOS, determine which program on your computer the file is associated with.

(c) - There are as many different file formats as there are different programs to process the files.

- Some formats add an advantage of reducing storage space because the allow data compression.

(ii)(a) - *Heat*. Processors can run exceptionally hot and if a computers cooling system is inadequate (because the machine has been upgraded, overclocked or just clogged up with dust and grime) it will only be a matter of time before it packs up for good.

- *Power surge/cut*. Power surges or unexpected power cuts can not only cause instant loss of data but can also fry a processor rendering it useless. It is not just power from the grid that causes problems either, lightning can surge through cables (even phone wires) frazzling your system and a buildup of static can cause similar results.

- *Dirt/Dust.* A dusty environment will clog a computer and block cooling vents causing a computer to overheat. Dust can also contain conductive material and particles can stick to circuit boards and cause a short circuit. A cloud of dust can also explode if it comes into contact with a source of ignition (like a computer). Even home computers if not properly cleaned can succumb to problems caused by too much dust.

- *Knocks/bangs.* Computers are sensitive machines, simply moving a PC to another room can cause havoc, disrupting the delicate circuitry and hard drives. Dropping a computer or severe knocks and bangs will permanently damage the circuits and processors or dislodge wiring.

(b) *In this question we could also refer to it as the disadvantages of Wireless communications*

- *Speed*: Wireless networks are typically slower than wired networks, sometimes even up to 10 times slower.

- *Security:* Wireless networks can be accessed by any computer within range of the network's signal so information transmitted through the network (including encrypted information) may be intercepted by unauthorized users.

- *Coverage:* The range of a wireless network is limited and a typical wireless router will only allow individuals within 150 to 300 feet to access the network.

- *Cost*: Wireless networks are typically inexpensive, but it can cost up to four times more to set up a wireless network than to set up a wired network in some cases.

- *Dependability:* Wireless networks are extremely susceptible to interference so radio signals, radiation and any other similar type of interference may cause a wireless network to malfunction.

(iii)(a) **HTTP**: Stands for Hypertext Transfer Protocol. the software (browser) won't be to transfer on the web and interpret hypertext in files.

(b) **FTP**: Stands for File Transfer Protocol. The communicating devices (client/server) won't be able to transfer files.

(c) **TCP/IP**: stands for Transmission Control Protocol with Internet protocol. In its absence effective communication (reliable delivery of data packets) won't be possible on a network.

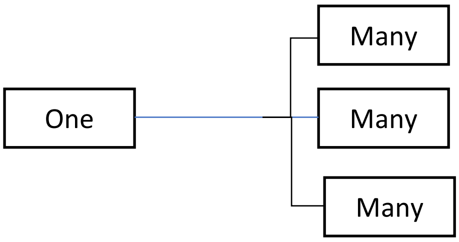
(iv) - **Bluetooth** is a low power, short-range wireless technology largely used to interconnect computing devices into a personal area network. It is based on IEEE standard 802.15 which gives specifications for Wireless Personal Area Network (WPAN).

- Wi-Fi stands for Wireless Fidelity. It is based on a set of wireless networking technologies known as 802.11. These include 802.11b, 802.11a, 802.11g and 802.11n. The range of Wi -Fi network transmission is about 30-40m indoors and up to about 100m outdoors.

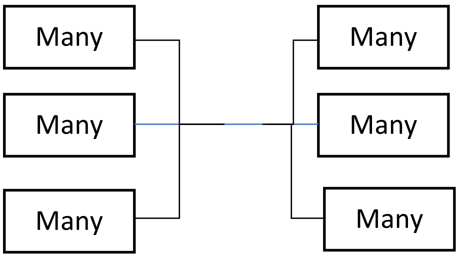
- WiMax stands for Worldwide Interoperability for Microwave Access. It is based on IEEE standard 802.16 and facilitates high speed wireless network links to both fixed and mobile devices. The range of a WiMax wireless connection is around 3-10km.

5(i)(a) **One-to-one relationship**: A "One to one" relationship between two tables means that a row in one table can only relate to one row in the table on the other side of their relationship and vice versa. For example: One person to one address

(b) **One-to-many relationship**: a one-to-many relationship exists when one row in table A may be linked with many rows in table B, but one row in table B is linked to only one row in table A. For example, one cinema has many customers.



(c) **Many-to-Many Relationship:** refers to a relationship between tables in a database when a parent row in one table contains several child rows in the second table, and vice versa. Many-to-many relationships are often tricky to represent. Example: many subjects can be taken by many students.



(ii) *See answer to question 9(iv) June 2011. Notes on the advantages and disadvantages of the topologies can be found in Chapter 9 of Fundamentals of ICT for Cameroon Secondary Schools.*

(iii)(a) *see answer to question 3(ii)(b) June 2011*
(b) *See answer to question 6(i)(a) June 2014*
(c) *See answer to question 6(iii) June 2010*
(d) *See answer to question 9(i)(b) June 2013*

(e) DNS: Stands for Domain Name Server. is a service which performs the function of turning human understandable domain names into IP addresses.

6(i) *Threats to safety of data simply means those things which could compromise the protection of data. In this case most computer crimes (hacking, creation of malwares, unauthorized use, unauthorized access) are threats to data safety. Read more on Computer crimes, chapter 2, Fundamentals of ICT for Cameroon Secondary Schools.*

(ii)(a) *See answer to question 1(ii)(c) June 2010*

(b) *See answer to question 1(ii)(a) June 2010*

(c) *See answer to question 1(ii)(b) June 2010*

(iii) *See answer to question 7(iv)(c) June 2014*

(iv)(a) *See answer to question 8(ii)(a) June 2011*

(b) *See answer to question 8(ii)(b) June 2011*

(c) **Gantt Chart**: A Gantt chart is a horizontal bar graph that helps plan and monitor project development or resource allocation on a horizontal time scale. It depicts project tasks against a calendar.

(d) *See answer to question 7(ii) June 2013*

7(i)(a) *See answer to question 4(iii)(a) June 2013*

(b) **Defragmenter**: detect computer files whose contents are broken across several locations on a disk, and move the fragments to one location to increase efficiency.

(c) *See answer to question 3(ii)(a) June 2012*

(d) *See answer to question 4(iii)(b) June 2013*

(ii) *Following are some of important functions of an operating System.*

Memory Management, Processor Management, Device Management, File Management, Security, Control over system performance.

(iii) **Interrupt:** An interrupt is a signal from a device attached to a computer or from a program within the computer that causes the main program that operates the computer (the operating system) to stop and figure out what to do next. For example, pressing a key on the keyboard or moving the mouse triggers hardware interrupts that cause the processor to read the keystroke or mouse position.

(iv)(a) *See answer to question 4(i)(a) June 2013*

(b) *pseudo-code that request marks for 5 subjects and calculates the average assuming all subjects have equal coefficient*

```
Begin
        Get Mark1
        Get Mark2
        Get Mark3
        Get Mark4
        Get Mark5
.   Total = Mark1 + Mark2 + Mark3 + Mark4 + Mark5
    Result = Total/5
    Print Result
End
```

8(i)(a) **Monitoring System:** Monitoring systems are responsible for controlling the technology used by a company (hardware, networks and communications, operating systems or applications, among others) in order to analyze their operation and performance, and to detect and alert about possible errors.

(b) **Control system**: A control system is a device, or set of devices, that manages, commands, directs or regulates the behavior of other devices or systems. Examples are traffic light control systems, greenhouse control systems, and patient monitoring systems.

(ii) *See answer to question 3(i)(a) June 2010*

(iii) (a) **Carpal Tunnel Syndrome (CTS):** This is caused by continuous tension of the arm muscles and tendon by hitting the keyboard and turning the mouse in the same manner for long hours especially sitting poorly. The following can be done to prevent CTS:

- Take intervals of 5 to 10 minutes every time you working for long on the computer.
- Always use a firm and comfortable chair if possible that is adjustable.

(b) **Eyestrain**: Long hours of work on the computer may cause vision problems because computer screens especially CRT emit that affect the eyes. Some effects of CVS include tired, sore and itching eyes, blurred vision and eye strain, increased sensitivity to light. Methods of prevention include:

- Take a break of 5 to 10 minutes away from the computer every hour.
- Reduce glare and reflections from the computer screen.
- Clean your screen and block out excessive sunlight and reflection from lamps.
- Adjust the contrast and brightness of the monitor.

(iv) *Transfer of funds in Ecommerce is slightly different from Electronic fund transfer at the point of sale. In this section, I will help explain who ecommerce and I will equally describe how the transfer of funds is accomplished in Ecommerce.*

- Sitting at her computer, a customer tries to order a book online. Her Web browser communicates back-and-forth over the Internet with a Web server that manages the store's website.
- The **Web server** sends her order to the order manager. This is a central computer that sees orders through every stage of processing from submission to dispatch.
- The **order manager** queries a database to find out whether what the customer wants is actually in stock.
- If the item is not in stock, the **stock database** system can order new supplies from the wholesalers or manufacturers. This might involve communicating with order systems at the manufacturer's warehouse to find out estimated supply times while the customer is still sitting at her computer (in other words, in "real time").
- The stock database confirms whether the item is in stock or suggests an estimated delivery date when supplies will be received from the manufacturer.
- Assuming the item is in stock, the order manager continues to process it. Next it communicates with a **merchant system** (run by a credit-card processing firm or linked to a bank) to take payment using the customer's credit or debit card number.
- The merchant system might make extra checks with the customer's own bank computer.
- The bank computer confirms whether the customer has enough funds.
- The merchant system authorizes the transaction to go ahead, though funds will not be completely transferred until several days later.
- The order manager confirms that the transaction has been successfully processed and notifies the Web server.
- The Web server shows the customer a Web page confirming that her order has been processed and the transaction is complete.
- The order manager sends a request to the warehouse to dispatch the goods to the customer.
- A truck from a dispatch firm collects the goods from the warehouse and delivers them.
- Once the goods have been dispatched, the warehouse computer e-mails the customer to confirm that her goods are on their way.
- The goods are delivered to the customer

9(i)(a) **Process**: A process is a program in execution. It consists of the program's instructions and the resources allocated to it for execution. A program is static while a process is active.

(b) See answer to question 7(iii) June 2015

(c) **Deadlock:** Deadlock is a permanent blocking of a set of processes competing for resources. It is a situation in which each of two processes is waiting for the other to do something; thus, neither one can proceed.

(ii) *Functions of the Operation system*

(a) ***Memory Management****:*

- Keeps tracks of primary memory, i.e., what part of it are in use by whom, what part are not in use.
- In multiprogramming, the OS decides which process will get memory when and how much.

- Allocates the memory when a process requests it to do so.
- De-allocates the memory when a process no longer needs it or has been terminated.

(b) ***Secondary storage Management:***
The main purpose of a computer system to execute programs. These programs must be in main memory during execution. But main memory is too small to accommodate all data and programs, and programs, and also data it holds are lost when power is lost, so the computer system must provide a secondary storage to back up main memory.
(iii) *Differentiate between multiprocessing and multiprogramming*.

	Multiprocessing	**Multiprogramming**
1	Multiprocessing refers to processing of multiple processes at same time by multiple CPUs.	Multiprogramming keeps several programs in main memory at the same time and execute them concurrently utilizing single CPU.
2	It utilizes multiple CPUs.	It utilizes single CPU.
4	Less time taken to process the jobs.	More Time taken to process the jobs.
5	It facilitates much efficient utilization of devices of the computer system.	Less efficient than multiprocessing.
6	Usually more expensive.	Such systems are less expensive.

(iv)(a) **Telemedicine:** Telemedicine allows health care professionals to evaluate, diagnose and treat patients at a distance using telecommunications technology. In simpler terms, Telemedicine is the exchange of medical information from one site to another through electronic communications. This is done for the purpose of improving a person's health

(b) *Benefits of Telemedicine to remote communities in Cameroon*

- *Telemedicine increases access to care*: Distance and travel time between patients and care providers can limit access to care. Fortunately, telemedicine can overcome geographic barriers to healthcare, especially for specialized providers. Telemedicine can be particularly beneficial for patients in medically underserved communities and those in rural geographical locations where clinician shortages exist.

- *Telemedicine reduces healthcare costs*: Telemedicine can increase efficiency of care delivery, reduce expenses of caring for patients or transporting to another location, and can even keep patients out of the hospital.

- *Telemedicine improves patient engagement and satisfaction*: Telemedicine makes it easier and more convenient for patients to stay healthy and engaged in their health care. Patients love the convenience, flexibility and real-time care with their providers.

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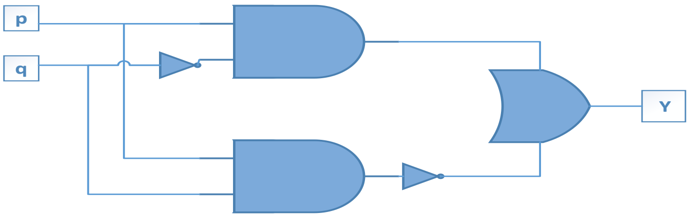
1(i)(a) *See answer to question 6(i)(b) June 2012*

(b) **Stock Control System**: A stock control system is basically a database that keeps track of stock and informs users of when to re-order along with helpful sales reports. A stock control system enables a user to manage his stock more effectively. A file is created for each item and for each item is assigned a unique identifier (usually a number), this identifier is used in all transactions concerning the item.

(c) **eLearning** is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. In most cases, it refers to a course, program or degree delivered completely online. It is not a course delivered via a DVD or CD-ROM, video tape or over a television channel.

(ii)(a) *See answer to question 5(i)(b) June 2014*

(b) Logic circuit for $(\boldsymbol{p}\ \mathit{AND}\ \overline{\boldsymbol{q}})\ \mathit{OR}\ (\overline{\boldsymbol{p}\ \mathit{AND}\ \boldsymbol{q}})$



(iii)(a) A definition of software reuse is the process of creating software systems from predefined software components. A reusable component may be code, but the bigger benefits of reuse come from a broader and higher-level view of what can be reused. Software specifications, designs, tests cases, data, prototypes, plans, documentation, frameworks, and templates are all candidates for reuse. Some advantages of software reuse are; Increase software productivity, shorten software development time, develop software with fewer people, reduce software development and maintenance costs.

The goal of software reuse is to reduce the cost of software production by replacing creation with recycling.

(b) *Criteria for Software reuse*

Build for reuse
- **Abstraction:** Identify units of reusable knowledge and concisely represent them in abstract form.
- **Classification**: Store the reusable knowledge into a “knowledge base” that is indexed and classified.

Build with reuse
- **Selection**: Query the reusable knowledge into parameterized form (e.g. function with formal parameters)
- **Specialization**: Modify the reusable knowledge to fit new situations (e.g. function with actual parameters)
- **Integration**: Combine the reusable knowledge with your project (e.g. invocation, weaving, etc.)

Bonus: ***Classic software reuse examples;*** *Over 90% of source code in new applications is reuse code*

- *High-level programming languages (e.g., Java, SQL)*
- *Menu/table driven mechanism for specifying parameters (e.g. GUI widgets)*
- *Application frameworks (e.g. Smalltalk, Motif, Swing/SWT)*
- *Document generations (e.g. Javadoc/XDoclet, DocBook, LaTeX, CSS, RSS, XSLT)*
- *Plugin-ins, Skins, Themes, Macros, Extensions (e.g. Eclipse, Word, WinAmp, Mozilla Firefox etc.)*
- *Domain engineering and application generation (e.g. SAP)*
- *Domain-specific languages (DSL) and transformation systems (e.g. Draco, TXL)*
- *4-G languages (e.g. SQL, Wizards, templates, MIL/ADL, etc.)*

(c) *Situations that may cause organization to engage in outsourcing. This indirectly asks us to give the reasons which could lead a company to outsource, to an extent, the advantages of outsourcing could also be a good answer to this question.*

- *Cost reduction***.** More often than not, outsourcing means saving money. This is often due to lower labor costs, cheaper infrastructure, or an advantageous tax system in the outsourcing location.
- *Access to skills that are unavailable locally*. Resources that are scarce at home can sometimes be found in abundance elsewhere, meaning you can easily reach them through outsourcing.
- *Better use of internal resources***.** By delegating some of your business processes to a third party, you'll give your in-house employees the opportunity to focus on more meaningful tasks.
- *Accelerated business processes***.** When you stop wasting time on mundane, time-consuming processes, you'll be able to move forward with your core offering a lot faster.

Bonus: *Outsourcing is the practice of hiring resources from outside of an organization to handle certain information technology functions. For instance, companies often outsource data storage because it is cheaper to contract a third party than it is to buy and maintain their own data storage devices and facilities*

2(i)(a) *See answer to question 9(i) June 2010*

(b) *Disadvantages of Client/server Network*

- *Congestion in Network***:** Too many requests from the clients may lead to congestion, which rarely takes place in Peer to peer network. Overload can lead to breaking-down of servers. In peer-to-peer, the total bandwidth of the network increases as the number of peers increase.

- *Cost*: It is very expensive to install and manage this type of computing. You need professional IT people to maintain the servers and other technical details of network.

- *Client-Server architecture is not as robust* as a peer to peer and if the server fails, the whole network goes down. Also, if you are downloading a file from server and it gets abandoned due to some error, download stops altogether. However, if there would have been peers, they would have provided the broken parts of file.

(ii)(a) An **information system** is an integrated set of components for collecting, storing, and processing data and for delivering information, knowledge, and digital products. A computer information system is a system that uses computers as a tool to collect and store enormous volumes of data. It uses computers to process business transactions at great speed and with great accuracy.

(b) Procedure is a component of an information system. There are five (5) components of an information system; Hardware, Software, Data, People, Procedures.
- ***Hardware***: Hardware refers to the physical devices that make up the system. They are the whole set of equipment used for input, processing, storage and communication of data.
- ***Software***: Software is the collection of computer programs used in the system. They provide the instructions that tell the computer what to do.
- ***Data***: Data are raw, unorganized, potentially useful facts and figures that are processed to produce information.
- ***People***: People are the main actors of the system. They are the users of the information system. They input data into the computer, give some direction to the computer to perform tasks and review information on the computer for output.
- ***Procedures***: Procedures are the series of documented actions taken to achieve a particular goal. A procedure is more than a single simple task. It can be complex and involved, such as reinstalling software, performing a backup etc

(c) *GIS: See answer to Question 3(i)(b) June 2011, LIS; See answer to question 6(iii)(d) June 2012*
(iii)(a) *see answer to question 8(ii)(b) June 2013*
(b) *See answer to question 8(i)(b) June 2010*
(c) *See answer to question 8(i)(a) June 2010*

3(i)(a) *See answer to question 8(i)(a) 2011*

(b) *Advantages of the direct implementation method*

- Fastest way of changing from one system to another
- New system can be used immediately after installation
- cheap method of implementation as you don't pay two sets of staffs. You only pay staff using the new system.

(ii)(a) *see answer to question 2(ii)(a) June 2011, Question 7(iv)(b) June 2010*

(b) See answer to question 2(ii)(b) June 2011, question 9(ii)(b) June 2014

(iii) *The question aims at knowing the changes which the use of ICT can bring to your workplace. In other words, we could simply provide the impact of ICT to employees in an organization (impact on employment).*

ICT is more likely to have changed someone's work rather than led to them losing their job. People in certain professions have had to be retrained to make use of modern technology:

- Secretaries now use *word processors* and not typewriters.
- Travel agents book holidays by computer, not by phone or letter.
- *Telephone banking* has meant that many bank staff now work by phone in front of a computer, instead of being in a branch, behind a counter.
- De-skilling has taken place. Some jobs which needed a high level of skill in the past can now be done more easily. For example, print workers today can use *DTP software* to lay out their work.
- Designers now use *CAD software* rather than pencil and paper on a drawing board.

However, it is fair to say that the development of information technology has led to many new jobs such as computer technicians, programmers, web designers and systems analysts.

4(i)(a) *See answer to question 9(vi) June 2010*

(b) – *Integrating additional hardware to a computer (Management of I/O devices)*

- Hiding the complexities of hardware from the user.
- Managing between the hardware's resources which include the processors, memory, data storage and I/O devices.
- Handling "interrupts" generated by the I/O controllers.
- Sharing of I/O between many programs using the CPU.

- *Managing RAM usage during processing (memory management)*

See answer to question 9(ii)(a) June 2015

(ii)(a) The Computer Interface is the interaction between the User and the computer, letting the user send commands with the expected results. Two forms of the Interface User are the Command Line Interface and the Graphical User interface.

(b) *Characteristics of the Graphical User Interface*

Characteristic	**Description**
Windows	Multiple windows allow different information to be displayed simultaneously on the user's screen.

Characteristic	Description
Icons	Usually icons represent files (including folders and applications), but they may also stand for processes (e.g., printer drivers).
Menus	Menus bundle and organize commands (eliminating the need for a command language).
Pointing	A pointing device such as a mouse is used for command choices from a menu or indicating items of interest in a window.
Graphical	Graphical elements can be commands on the same display.

(c) *Advantages of Graphical User interface over Command line interface*

- A major advantage of GUIs is that they make computer operation more intuitive, and thus easier to learn and use.
- GUIs generally provide users with immediate, visual feedback about the effect of each action.
- GUI allows multiple programs and/or instances to be displayed simultaneously.
- Users do not need to know any programming languages.

(iii)(a) *See answer to Question 4(iii)(b) June 2011*

(b) **Buffers**: A buffer is a data area shared by hardware devices or program processes that operate at different speeds or with different sets of priorities. The buffer allows each device or process to operate without being held up by the other. Like a cache, a buffer is a "midpoint holding place" but exists not so much to accelerate the speed of an activity as to support the coordination of separate activities.

This term is used in both programming and in hardware. In programming, buffering sometimes implies the need to screen data from its final intended place so that it can be edited or otherwise processed before being moved to a regular file or database.

(c) **NIC**: Network interface Card is also known as Ethernet Card. *See answer to Question 4(i)(c) June 2014*

(iv)(a) Computer **memory** is any physical device capable of storing information temporarily like RAM (random access memory), or permanently, like ROM (read-only memory). Memory devices utilize integrated circuits and are used by operating systems, software, and hardware.

(b) Read only memory (ROM) is a kind of memory whose contents can only be read by the computer. Data found in ROM is written by the manufacturer and cannot be modified by the user. ROM is useful for holding data that never changes like the “boot” or start-up program which is run when the computer is switched on. ROM is *non-volatile* meaning that its content is preserved even without power.

5(i)(a) **Programming** is the process of designing and building an executable computer program for accomplishing a specific computing task. In simpler terms, it is the art of telling a computer what to do through a set of instructions, or the activity of writing computer programs.

(b) *Properties of a good program*

- *Portability*: Portability refers to the ability of an application to run on different platforms (operating systems) with or without minimal changes. Due to rapid development in the hardware and the software, nowadays platform change is a common phenomenon. Hence, if a program is developed for a particular platform, then the life span of the program is severely affected.

- *Readability*: The program should be written in such a way that it makes other programmers or users to follow the logic of the program without much effort. If a program is written structurally, it helps the programmers to understand their own program in a better way. Even if some computational efficiency needs to be sacrificed for better readability, it is advisable to use a more user-friendly approach, unless the processing of an application is of utmost importance.

- *Efficiency*: Every program requires certain processing time and memory to process the instructions and data. As the processing power and memory are the most precious resources of a computer, a program should be laid out in such a manner that it utilizes the least amount of memory and processing time.

- *Structural*: To develop a program, the task must be broken down into a number of subtasks. These subtasks are developed independently, and each subtask is able to perform the assigned job without the help of any other subtask. If a program is developed structurally, it becomes more readable, and the testing and documentation process also gets easier.

- *Flexibility*: A program should be flexible enough to handle most of the changes without having to rewrite the entire program. Most of the programs are developed for a certain period and they require modifications from time to time. For example, in case of payroll management, as the time progresses, some employees may leave the company while some others may join. Hence, the payroll application should be flexible enough to incorporate all the changes without having to reconstruct the entire application.

- *Generality:* Apart from flexibility, the program should also be general. Generality means that if a program is developed for a particular task, then it should also be used for all similar tasks of the same domain. For example, if a program is developed for a particular organization, then it should suit all the other similar organizations.

- *Documentation*: Documentation is one of the most important components of an application development. Even if a program is developed following the best programming practices, it will be rendered useless if the end user is not able to fully utilize the functionality of the application. A well-documented application is also useful for other programmers because even in the absence of the author, they can understand it.

(ii)(a) **Application software** is computer software that causes a computer to perform useful tasks beyond the running of the computer itself. They provide user-oriented functionality. Application software are used to carry out productive work like typing a letter, designing and invitation card, surfing the Internet, listening to music or watching a movie.

(b) *See answer to question 2(iii) June 2013*

(c) **Biometrics** is the science and technology of measuring and analyzing biological data. In computer security, it refers to the use of measurable biological characteristics such as fingerprints, eye retinas, iris patterns, facial patterns, voice patterns, hand measurements and DNA, to identify a person. It is the safest authentication technique.

(iii) *Advantages of Simulation*

- *Test the behavior*: With simulation, we can test the behavior of something without making it. We can make environment or model of the system that can behave similarly like actual system. Experiments are done on the model without disturbing the actual system. We can investigate the situation which is dangerous in real life.

- *Analyze the system*: We can analyze different parts of the system while testing its model. Analysis of complex system is done through simulation when we do not get results through the mathematical way.

- *Give Accurate Results*: Most of the time the result of the simulation is accurate than doing analytical or practical testing on the actual system.

- *Get faults in the system:* While doing simulation we can note down the faults in the system. If something gives an unexpected result, then we can fix it before launching the system. We can make changes in the model and check the reaction of the model.

- *Animation and modelling*: With simulation, engineers can see the actual product (e.g. car) without practically building it. They can change the look and feel of the product during modeling. Engineers can get inner details of the product and overall look of the product easily in the simulation.

(iv)(a) **ASCII**: American Standard Code for information Interchange
(b) **PAN network**: Personal Area Network(PAN)
(c) **EPROM**: Erasable Programmable Read Only Memory.

6(i) (a) **Algorithm efficiency** is a measure of the average execution time necessary for an algorithm to complete work on a set of data. Algorithm efficiency is characterized by its order. Typically a bubble sort algorithm will have efficiency in sorting N items proportional to and of the order of N^2, usually written $O(N^2)$. *Read more on chapter 13 of Fundamentals of ICT for Cameroon Secondary schools.*
(b) The two main measures for the efficiency of an algorithm are; *Time and Space.*
Time efficiency - a measure of amount of time for an algorithm to execute.
Space efficiency - a measure of the amount of memory needed for an algorithm to execute.
From these measures, the basic resources a computer can use are; Processor and Memory.
(ii)(a) *See answer to question 4(ii)(a)&(b) June 2012.*
(b) *See answer to question 5(iii) June 2016 above.*

(iii)(a) *Similarities between an Operation and a Project*
- Both are performed by people,
- Both are planned, executed and controlled, and
- Both have resource limitation.

(b) *Differences between an Operation and a Project.*
- Projects are unique and temporary (definitive beginning and ending), while operations are ongoing and permanent with repetitive output.
- Projects have a fixed budget, while operations have to earn a profit to run the business.
- Projects are executed to start a new business objective and terminated when it is achieved, while operational work does not produce anything new and it is ongoing.
- Projects create a unique product, service, or result, while operations produce the same product, aim to earn a profit and keep the system running.

(iv)(a) *Security issues of a time-sharing environment*
- One user can read the private data of another user - privacy.
- One user can corrupt the private data of another user - integrity.
- One user can prevent another user from getting anything done - denial of service.

(b) *There are two answers, either one correct.*
Yes - if we can ensure that the operating system prevents any sharing of data between users, either for reading or writing, and fairly shares the computer, then we can achieve the same level of security.
No - we can never be sure that our software doesn't have bugs, so we can never be sure that we prevent all sharing of data and fairly allocate computer resources.

7(i) ***Software crisis*** *is a term for the difficulty of writing useful and efficient computer programs in the required time. It is also defined as the situation resulted due to the catastrophic failure of software development that leads to the incomplete and degrading performance of software products. Software* *crisis resulted due to the rapid increase in computer power and the complexity of the problems that could not be tackled. The most visible symptoms of the software crisis are;*

- Late delivery, over budget
- Product does not meet specified requirements
- Inadequate documentation
- Software was very inefficient and was of low quality

(ii)(a) **Parity Bit**: A parity bit, also known as a check bit, is a single bit that can be added to a binary string (block of data) for error detection purposes. It is set to either 1 or 0 to make the total number of 1-bits either even ("even parity") or odd ("odd parity") which is used to validate the integrity of data.

The purpose of a parity bit is to provide a simple way to check for errors later. When data is stored or transferred electronically, it's not uncommon for bits to "flip" — change from a 1 to a 0, or vice versa. Parity checks can help detect some of these errors. For example, to check a binary sequence that has even parity, the total number of ones can be counted. If the number of ones is not even, an error is likely to have occurred.

(b) The Advanced Research Projects Agency Network (**ARPANET)** is a predecessor to the modern Internet. It was conceptualized in the 1950s, when computer scientists needed something better than the then available but unreliable switching nodes and network links.

There were also only a limited number of large, powerful research computers, and researchers with access were separated geographically. The Advanced Research Projects Agency (ARPA) commissioned the development of an advanced and reliable way to connect these computers through a newly devised packet switching network, which was known as ARPANET.

(c) **Internet standard**: An internet standard (STD) is a specification that has been approved by the *Internet Engineering Task Force (IETF).* Such standard helps to promote a consistent and universal use of the internet worldwide.

(iii)(a) A **prototype** is an initial version of a multimedia product. The prototype is tested to make sure it is fit for the audience and purpose. If there are any errors or problems, the prototype is improved and tested again. This goes on until the product is considered to be fully functional and suitable. This process is known as ***prototyping and testing.***

(b) *Benefits of Prototyping*

- Prototyping helps to eliminate ambiguities and improve accuracy in interpretation of system requirements and functionality

- Prototyping helps to ensure that the solution does what it is supposed to do - not what the developer thinks it ought to do, or how

- Prototyping allows the developer to quickly demonstrate (or walkthrough) a system or part thereof, albeit limited in that its purpose may be to simply provide an insight or overview of a system (e.g. look and feel of the user interface), or to focus on a component part in detail but possibly in isolation (e.g. standalone rather than integrated)

- Prototyping helps to identify and address problems early on (e.g. missing, confusing or misunderstood features)

- Prototyping allows the developer to explore ideas and exchange feedback with the client and end-user. This is an important step in preparing to develop a solution that is fit for purpose, does what it needs to do, and does it well

(iv) *The HD (High Density) format of a 1.44MB 3-1/2-inch floppy disks has 80 tracks with 18 sectors per track and 512 bytes per sector and two sides for each disk.*

So, 80tracks x 18sectors x 512bytes x 2sides equals 1,474,560 bytes.

If you divide that number by 1024, you get the 1440K size nomenclature. *A 1.44MB floppy is really a 1440K floppy, where K is 1024 bytes.*

8(i)(a) *See answer to Question 1(i)(a) June 2014*
(b) *See answer to question 1(i)(b) June 2010*
(c) *See answer to question 2(iii)(a) June 2014*
(d) *See answer to question 9(i)(b) June 2013*
(e) *See answer to question 6(iii) June 2012*
(ii)(a) *See answer to question 1(i)(e) June 2010. Read more on Chapter 2, Fundamentals of ICT for Cameroon Secondary Schools.*

(b) *Encryption is the process of transforming a message using an algorithm into a form unreadable by anyone except the intended recipient.*

Unencrypted data, often referred to as *plaintext*, is encrypted using an encryption algorithm and an *encryption key*. This process generates *ciphertext* that can only be viewed in its original form if decrypted with the correct key. *Decryption* is simply the inverse of encryption, following the same steps but reversing the order in which the keys are applied. *To read an encrypted message, one must have access to a key that will enable them to decrypt it.*

9(i)(a) *Advantages and disadvantages of Ecommerce*

Advantages:

- *Cost Effective*: The entire financial transactions will eventually become electronic, so sooner conversion is going to be lower on cost. It makes every transaction through ecommerce payment a lot cheaper.

- *Higher Margin*: E-commerce also enables us to move better with higher margin for more business safety. Higher margin also means business with more control as well as flexibility. You can also save time from the e-commerce.

- *Better Productivity:* Productivity here means productivity for both companies and customers. People like to find answers online because it is faster and cheaper, and it costs a lot cheaper expense as well for the company.

- *Quick Comparison*: E-commerce also enables you to compare price among several providers. In the end, it leads you to smart shopping. People can save more money while they shop.

Disadvantages of Ecommerce:

- *Security*: Customers need to be confident and trust the provider of payment method. Sometimes, we can be tricked. Examine on integrity and reputation of the web stores before you decide to buy.

- Scalability of System: A company definitely needs a well-developed website to support numbers of customers at a time. If your web destination is not well enough, you better forget it.

- *Integrity on Data and System*: Customers need secure access all the time. In addition to it, protection to data is also essential. Unless the transaction can provide it, we should refuse for e-commerce

(b) *Advantages and disadvantages of E-Banking.*

Advantages	***Disadvantages***
• Higher interest rate offers • Lower fees • Cashback and other rewards	• No face-to-face customer service • Limited capabilities compared to retail banks • Difficult to conduct cash transactions

- Emphasis on mobile and online banking	- No physical locations

(c) *Advantages and Disadvantages of E health*
Advantages of E-health:
- Reduces staff stress.
- Makes an efficient and accessible patient record.
- Time saving and reducing indirect works, that leads to more direct care delivery.
- Causes keeping staff in their possession and attracting them.
- Provides anonymity to users

Disadvantages of E-health:
- Concerns regarding treatment credibility
- User privacy and confidentiality.
- Changes communication processes with staff.
- Training of staff is quite time-consuming.

(ii)(a) **Social Networking** refers to grouping of individuals and organizations together via some medium, in order to share thoughts, interests, and activities. There are several web based social network services available such as Facebook, twitter, linkedin, Google+ etc. which offer easy to use and interactive interface to connect with people with in the country and overseas as well. There are also several mobile based social networking services in the form of apps such as WhatsApp, hike, Line etc.

(b) *Advantages and disadvantages of Social networks*
Advantages of Social networks
- *Staying Connected:* The main purpose of social media is to be able to stay connected to friends and families in today's fast paced and ever-changing worlds. You are able to rekindle old friendships, share family photos, and special events in your life with just about everyone you know, at the same time.

- *Finding People with Common Interests:* Social networking is also a great way to meet entirely new people. You can seek out groups that are focused towards your special interests and hobbies and connect with local people that share the same interests. Online and social media dating is almost more common than traditional dating is in today's world.

Disadvantages of Social networks

- *Perpetuates False and Unreliable Information:* Just like stated above, anything can spread to millions of people within hours or days on social media. This also, unfortunately, includes things that are false or made up. This information can cause panic and severe misinformation in society.

- *Causing Major Relationship Problems*: Online social interactions with social networking have not only been starting new relationships, but ending many others. It is very simple to communicate and share pictures or plans with a person on social media and keep it completely under wraps. This new temptation has been driving wedges into people's real life, offline relationships, often time ending them for good. Social networking puts trust to the limit

(iii)(a) **Syntax errors**: A syntax error is an error in a program that occurs due to the non-respect of the syntax rules of the language used. A syntax error will cause a compiler/interpreter to stop trying to generate machine code and will not create an executable.

Syntax is the set of rules that specify how the symbols of a language can be put together to form meaningful statements. In other words, syntax defines the structure of legal statements in a language.

(b) **Run-time errors**: A run-time error is an error that occurs during program execution. For example, a run -time error may occur if division by 0 is attempted. A run-time error may cause the program to stop execution, or it may be handled by an error-trapping routine

(c) **Logic errors**: A logical error occurs due to the poor understanding of the problem. For instance if you want to find the modulo of a certain number *(eg: a%4)* instead you wrote the program for division *(eg: a/4)* then this type of error is considered to be the logical error.

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1(i)(a) *See answer to question 8(i)(a) June 2015.*
(b) *See answer to question 8(i)(a) June 2015.*
(ii) (a)*See answer to questions 6(iii) June 2012*
(*b) In this question, the student may mistake the reasons why MIS fail to its disadvantages. I wish to say there are clear differences, the fact that you may use a MIS to manage your company and it fails doesn't necessarily account for the disadvantages.*

Many organizations use MIS successfully, others do not. Though the hardware and the software is the latest and has appropriate technology, its use is more for the collection and storage of data and its elementary processing. There are some factors which make the MIS a success and some others, which make it a failure

Factors Contributing to Success

If a MIS is to be success, then it should have all the features listed as follows:

- The MIS is integrated into the managerial functions. It sets clear objectives to ensure that the MIS focuses on the major issues of the business.

- An appropriate information processing technology required to meet the data processing and analysis needs of the users of the MIS is selected.

- The MIS is oriented, defined and designed in terms of the user's requirements and its operational viability is ensured.

- The MIS is kept under continuous surveillance, so that its open system design is modified according to the changing information needs.

- MIS focuses on the results and goals, and highlights the factors and reasons for non achievement.

- MIS is not allowed to end up into an information generation mill avoiding the noise in the information and the communication system.

- The MIS recognizes that a manager is a human being and therefore, the systems must consider all the human behavioral factors in the process of the management.

Factors Contributing to Failures

Many a times MIS is a failure. The common factors which are responsible for this are listed as follows:

- The MIS is conceived as a data processing and not as an information processing system.

- The MIS does not provide that information which is needed by the managers but it tends to provide the information generally the function calls for. The MIS then becomes an impersonal system.

- Underestimating the complexity in the business systems and not recognizing it in the MIS design leads to problems in the successful implementation.

- Adequate attention is not given to the quality control aspects of the inputs, the process and the outputs leading to insufficient checks and controls in the MIS.

- The MIS is developed without streamlining the transaction processing systems in the organization.

- Lack of training and appreciation that the users of the information and the generators of the data are different, and they have to play an important responsible role in the MIS.

- The MIS does not meet certain critical and key factors of its users such as a response to the query on the database, an inability to get the processing done in a particular manner, lack of user-friendly system and the dependence on the system personnel.

(iii)(a) **Digital Divide**: The digital divide refers to the gap between those who have and those who lack access to computers and the Internet.

(b) Factors which contribute(cause) to this gap (digital divide) are as follows;

- *Poor Areas*: The poor not only includes poor areas of our country but also includes entire countries which makes the digital divide a global issue. There are number of such countries which don't have the means of feeding talking less of implementing technological equipment to bridge the digital divide.

- *Disadvantaged individuals*: The disadvantaged includes the disabled, the unemployed, and the uneducated.

- *Getting Access to Rural Areas:* The major cause of the digital divide is access. Although this is the major contributing factor, there are other factors that contribute which include the following: *cost of technology, access for the disabled, lack of skills, lack of education, lack of information, and lower-performance computers.* The cost of technology affects the poor areas and although the costs have come down significantly since the dawn of the internet, some perceive this as an "extra" or luxury that is not needed. Access for the disabled is a concern because these individuals require special software and equipment in order to meet their needs.

- *Lack of interest*: Since some people are just resistant to change, they have no interest in joining the age of technology. Some communities believe their cultures could go extinct if they embrace technology and all its good tidings, thus making them adamant to change.

2(i) *See answer to question 3(i)(a) June 2010*
(ii)(a) *See answer to question 3(ii)(b) June 2010*
(b) *See answer to question 3(ii)(b) June 2010*
(iii)(a) *See answer to question 7(iv)(a) June 2014*

(b) *Differences between Baseband and Broadband transmissions*

Basis for comparison	**Baseband transmission**	**Broadband transmission**
Type of signaling used	Digital	Analog
Application	Work well with bus topology.	Used with a bus as well as tree topology.
Transmission	Bidirectional	Unidirectional
Signal range	Signals can be travelled over short distances	Signals can be travelled over long distances without being attenuated.

(c) *See answer to question 7(iv)(c) June 2014*

(iv)(a) **Chat room**: A chat room is a designated virtual channel where users communicate with each other through the Internet, traditionally in plain text only. More recent developments in Web technology now allow the transmission of images and emoticons in a chat room as well. The term can mean *online* *chatting, instant messaging* and *online forums using either synchronous or asynchronous conferencing. Some chat rooms require a username and password combination in order to log in or join a conversation, allowing for privacy among the users.*

(b) **Instant Messaging(IM)**: An instant message (IM) is a real-time, text-based communication similar to chat. IM uses a shared software client between or among two or more people using personal computers, iPhones or other devices. The communication is done over a network, often the Internet, and may include advanced modes with live voice or video. File transfers are also sometimes allowed but are limited in size.

(c) **Web log (blog):** A blog (web log) is a chronological journal-style website which its author (or "blogger") maintains like an online diary, with regular entries of commentary, descriptions of events, or other material such as graphics or video. Many blogs provide commentary or news on a particular subject; others function as more personal online diaries. They also provide the readers with the ability to leave comments in an interactive format.

3(i)(a) *Differentiate between data and information*

	Data	**Information**
Meaning	Data is raw, unorganized facts that need to be processed. Data can be something simple and seemingly random and useless until it is organized.	When data is processed, organized, structured or presented in a given context so as to make it useful, it is called information.
Example	Each student's test score is one piece of data.	The average score of a class or of the entire school is information that can be derived from the given data.

(b) Data quality (reasonable data or good data) is a perception or an assessment of data's fitness to serve its purpose in a given context. The quality of data is determined by factors such as accuracy, completeness, consistency, uniqueness, and timeliness.

- *Accuracy*: Data (information) needs to be of high quality to be useful and *accurate.* The information that is input into a database is presumed to be perfect as well as accurate. The information that is accessed is deemed reliable. Flaws do arise with database design but do not let something in your control, accurate and reliable data, be one of them. A database design that is accurate and reliable will help achieve the development of new business ideas as well as promoting the organizational goals.

- *Completeness* is another attribute of high quality data (information). Partial information may as well be incomplete information because it is only a small part of the picture. *Completeness* is as necessary as *accuracy* when inputting data into a database.

- *Consistency* is key when entering data (information) into a database. For example, with a column for a phone number entry 10 digits is the expected length of the field. Once the fields have been set in the database, a number more or less than 10 digits will not be accepted. The same applies for any field, whether it is an entry that requires a number, a series of numbers, an address, or a name, etc. If the fields are not set to a specific limit for information, then *consistency* is even more important.

- *Uniqueness* is the fourth component of high quality data (information). In order to add value to any organization, information must be unique and distinctive. Information is a very essential part of any organization and if used properly can make a company competitive or can keep a company competitive.

- *Timeliness*: A fifth important aspect of data (information) is timeliness. New and current data is more valuable to organizations than old outdated information. Especially now, in this era of high technological advances, out-of-date information can keep a company from achieving their goals or from surviving in a competitive arena. The information does not necessarily need to be out of date to have effect, it just needs to not be the most current. Real-time information is an element of timeliness.

(c) Bits < Bytes < Word < Field < Record < File < Folder < Data warehouse

(ii)(a) *See answer to question 2(ii)(a) June 2015*

(b) *There are 4 steps involved for Prototyping:*

- *Determine the needs of your users:* The requirements of your users drive the development of your prototype as they define the business objects that your system must support. You can gather these requirements in interviews, in CRC (class responsibility collaborator) modeling sessions, in use-case modeling sessions, and in class diagramming sessions

- *Build the prototype*. Using a prototyping tool or high-level language you develop the screens and reports needed by your users. The best advice during this stage of the process is to not invest a lot of time in making the code "good" because chances are high that you may just scrap your coding efforts anyway after evaluating the prototype.

- *Evaluate the prototype*. After a version of the prototype is built it needs to be evaluated. The main goal is that you need to verify that the prototype meets the needs of your users. I've always found that you need to address three basic issues during evaluation: *What's good about the prototype, what's bad about the prototype, and what's missing from the prototype*.

- *Determine if you're finished yet*: You want to stop the prototyping process when you find the evaluation process is no longer generating any new requirements, or is generating a small number of not-so-important requirements.

(c) *See answer to question 7(iii)(b) June 2016*

4(i)(a) *Internet connectivity modes vary but a majority of its components are unique. To get connected to the internet, You will need the following hardware;*

- ***Network interface card:*** A network interface card (NIC) provides the physical interface (link) between the computer and the communication medium. A NIC manages the communication and network protocol for the PC.

- ***Router***: A router is a device that joins several networks together and is responsible for routing data from one network to another. It keeps track of the IP addresses of the computers on the networks connected to its network interface cards and directs data packets appropriately.

- ***Cable***: Cables are used to link computers in a LAN. There are three types of cables commonly used: Coaxial cable, Twisted pair cable, Fiber optic cable.

- ***MODEM***: A modem (modulator/demodulator) is a device that encodes data for transmission over a particular medium, such as telephone line, coaxial cable, fiber optics, or microwaves.

(b) **Network Administrator:** For a better data communication, a network administrator sets up a network, access privileges and monitors the use of the network and resources.

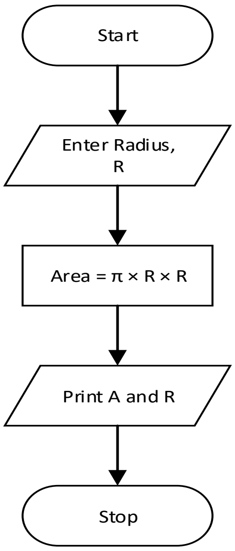
(ii)(a) - **Semantics** specify the meaning of a well-formed program.

A semantic error occurs when you write a program that works, but does not do what you intend it to do. Compilation and interpretation do not detect semantic errors. Semantic or logic errors are detected from wrong results. Something may be syntactically correct but semantically incorrect.

- **Syntax** is the set of rules that specify how the symbols of a language can be put together to form meaningful statements. *See answer to question 9(iii)(a) June 2016*

(b) – **Algorithm**: *See answer to question 8(i)(b) June 2013*
- **Pseudocode**: *See answer to question 4(i) June 2013*
- **Program**: A computer program is a set of instructions that will be followed by a computer to perform a computation. These instructions are made up of statements written in some languages specially designed for this purpose. These languages are called programming languages. In other words, a program is an algorithm expressed in a programming language.

(c) Flow chart



(iii) *Advantages of data normalization:*

- *Reduces Data Duplication:* Databases can hold a significant amount of information, perhaps millions or billions of pieces of data. Normalizing a database reduces its size and prevents data duplication. It ensures that each piece of data is stored only once.

- *Groups Data Logically:* Application developers who create applications to "talk" (interact) to a database find it easier to deal with a normalized database. The data they access is organized more logically in a normalized database, often similar to the way in which the real-world objects that the data represent are organized. That makes the developers' applications easier to design, write and change.

5(i) **Computer Crime**: Alternatively referred to as cybercrime, e–crime, electronic crime or Hi-tech crime. Computer crime is an act performed by a knowledgeable computer user, sometimes referred to as a hacker that illegally browses or steals a company's or individual's private information. In some cases, this group of individuals may be malicious and destroy or otherwise corrupt the computer or data files.

(ii) This question aims to know those security aspects which the bank can neglect and can cause adverse effects to its Information system.

- *Unauthorized Access to Confidential Data*: Deliberate Exposure, Weak passwords, Stolen Smard cards.
- *Illegal Transfer of money:* Computer fraud, Weak Passwords
- *Damage of data:* Absence of Virus checking software, No Data Backup and archiving.

(iii)(a) P = $\bar{A} \cdot B$

(b) *Truth Table for P*

A	**B**	$\bar{A}$	$\bar{A} \cdot B$
0	0	1	0

0	1	1	1
1	0	0	0
1	1	0	0

(c) *See answer to question 9(v) June 2010*

(iv) *Criteria for selecting Library Software*

- *Various computer platform***:** the various computer platform needed to run the software i.e. server, wireless connectivity, hard disc space needed etc.
- *Multiple platform***:** does the software able to run in multiple platforms such as windows 2000, windows N.T., windows98, 95 etc.
- *Capacity*: The restriction in total number of database /information /records in a database it can handle effectively.
- *Speed:* Speed of operation in different environment.
- *Flexibility:* Flexibility to handle of records of variable sizes.
- *Standardize data format:* Does it use standardize data form for importing and exporting of data.
- *Effectiveness*: Does the system meet the specification.
- *Reliability:* Does the search give consistent result?
- *Expandability:* Is the system permit addition

6(i)(a) **Management Information System (MIS):** *See Answer to question 6(iii) June 2012*

- **Decision Support System**: Decision support systems are designed to help tactical and strategic decision-making in situations where there is uncertainty about the possible outcomes of those decisions. They provide interactive support for non-routine decisions or problems.

- **Executive Information System(EIS):** Executive information systems (EIS) are designed to support the information needs of executive management. Their purpose is to analyze, compare and identify trends to help the strategic direction of the organization. Information in an EIS is presented in charts and tables that show trends, ratios, and other managerial statistics.

(b) *In this question we are asked the criteria to judge the success of an Information System. Analogous to the characteristics of a good Information system, we can deduce the success of an information system by knowing its good features.*

- *Relevance:* The information a manager receives from an IS has to relate to the decisions the manager has to make. An effective IS takes data that originates in the areas of activity that concern the manager at any given time, and organizes it into forms that are meaningful for making decisions. If a manager has to make pricing decisions, *for example, an MIS may take sales data from the past five years, and display sales volume and profit projections for various pricing scenarios.*

- *Usefulness*: The information a manager receives from an IS may be relevant and accurate, but it is only useful if it helps him with the particular decisions he has to make. *For example, if a manager has to make decisions on which employees to cut due to staff reductions, information on resulting cost savings is relevant, but information on the performance of the employees in question is more useful.* The MIS has to make useful information easily accessible.

- *Timeliness*: IS output must be current. Management has to make decisions about the future of the organization based on data from the present, even when evaluating trends. The more recent the data, the more these decisions will reflect present reality and correctly anticipate their effects on the company. When the collection and processing of data delays its availability, the IS must take into consideration its potential inaccuracies due to age and present the resulting information accordingly, with possible ranges of error. Data that is evaluated in a very short time frame can be considered real-time information. *For example, information on an increase in product defects may be flagged for instant management attention.*

- *Accuracy:* A key measure of the effectiveness of an IS is the accuracy and reliability of its information. The accuracy of the data it uses and the calculations it applies generally determine the effectiveness of the resulting information. However, not all data needs to be equally accurate. *For example, payroll information needs to be precise, but employee hours spent on a given task can be based on reasonable estimates*. The sources of the data determine whether the information is reliable. Historical performance is often part of the input for an MIS, and also serves as a good measure of the accuracy and reliability of its output.

(ii)(a) *See answer to question 8(ii)(a) June 2011*

(b) *By implementing Project Reviews, you are putting in place the necessary "check-points" to monitor and control the project, thereby ensuring its success. Project review is helpful because;*

- It clearly communicate the progress of your project to your sponsor.
- It List any risks or issues which have impacted the project
- It show your sponsor the deliverables produced to date
- Seek approval to proceed to the next phase

Bonus: *A **Project Management Review** is an exercise undertaken at the end of each Project Phase to identify the current status of the project. The Project Review identifies the deliverables which have been produced to date and determines whether or not the project has met the objectives set. The outcome of the Project Management Review is documented on a **project Phase Review Form** and this states whether the project is currently on track, within schedule and under budget.*

(iii)(a) *See answer to question 8(ii)(b) June 2011*

(b) A **flow chart** is a diagram that uses graphic symbols to describe the nature and flow of steps in an algorithm. Each step in a flowchart is followed by an arrow that indicates which step to go next. *See answer to question 5(ii)(b) June 2015.*

7(i)(a) Feasibility studies are carried out at the **System study phase** of the SDLC. *The aim here is conducting a preliminary feasibility study to determine whether a new or improved information system is a feasible solution. Though during the analysis phase of the SDLC, there is a **feasibility analysis** which is carried out.*

Bonus: *Feasibility analysis is a study which investigates the information needs of prospective users and determines the resource requirements, cost, benefits, and workability of a proposed project. Its goal is to evaluate alternative systems and propose the most feasible and desirable system for development.*

(b) Feasibility of a system can be evaluated in terms of four major categories: *Organizational feasibility, technical feasibility, economic feasibility and operational feasibility. The outcome of a feasibility analysis is a feasibility report which is presented to the user management for approval. It may be accepted or accepted with modifications or rejected.*

- ***Organizational feasibility***: focuses on how well a proposed information system supports the objectives of the organization and its strategic plan for information systems.

- ***Technical feasibility:*** focuses on the reliability/capabilities of the hardware and software to meet the needs of the proposed system, and whether they can be acquired or developed in the required time.

- ***Economic feasibility***: focuses on whether the tangible costs and benefits of the proposed system will exceed the costs of developing and operating it.

- ***Operational feasibility***: focuses on the ability of the end users to operate, use, and support the proposed system.

(d) *Systems design consists of design activities, which produce systems specifications satisfying the functional requirements developed in the systems analysis stage. While system analysis specifies what* *is to be done by the new system, system design describes how the system will accomplish what is to be done*.

- User Interface Design: A user interface is a means of interaction between the user and the computer-based application. This activity focuses on designing how data will be introduced into the system and how the information generated will be retrieved. *Read more on Chapter 14, Fundamentals of ICT for Cameroon Secondary Schools.*

- Data Design: Data design focuses on the design of the structure of data and files to be used by the proposed (new) system. *Read more on Chapter 14, Fundamentals of ICT for Cameroon Secondary Schools.*

- Process Design: Process design focuses on the design of software resources, that is, computer programs and of procedures needed by the proposed system.

(ii) *See answer to question 5(iii)(a) June 2015*

(iii)(a) *See answer to question 5(iv) June 2015 (Just get the aspect on how a customer purchases an item online via an ecommerce website)*

(b) *See answer to question 5(iii)(a) June 2015 (Just get the aspect on how a company publishes, and sells their item via an ecommerce website)*

(c) *See answer to question 5(iii)(a) June 2015*

(v) The Boolean data type has only two values: ***true*** **or** ***false.*** These values are used to control the flow of the execution of programs. *Boolean values are found by comparing other data values. The results of these comparisons may be combined in Boolean expressions. Read more on Chapter 7, Fundamentals of ICT for Cameroon Secondary Schools.*

8(i)(a) *See answer to question 4(i)(b) June 2015.*

(b) *File format classification*

Sound	Document	Spreadsheet	Bitmapped	Database	Hypermedia
.WAV	.PDF	.XLS	.JPEG, .PNG	.MDB	.XML

(ii) *Ways in which E government could enhance government services in Cameroon, could also be seen as the importance/advantages of e-government to Cameroon. Talking about the advantages of the e-government, you can easily analyze a number of advantages of e- governance. Some of them are mentioned below:*

- ***Speed***: e-governance means using electronic technology by the government. Electronic technologies make communication better, and faster. It will take very less time for any policy, or scheme to reach to the people. As you can see that internet, cell phones and mobile communications have these capabilities.
- ***Transparency***: Democracy is all about transparency. Since independence we have come to know that, it has become difficult for citizens of Cameroon to get information about the policies of the Government. In other words, it has become easier for wrong doers to hide the wrong deeds done by them from the eyes of the citizens. But, by using the internet, all the information of each and every policy will be directly available to the citizens, hence strengthening democracy.
- ***Accountability***: Accountability is answerability to the people by the government. Hence, once the transparency is achieved the government will automatically become accountable.
- ***Reduction in Cost****:* For implementing the various policies and schemes of the government, Millions of FCFA are invested in stationery materials like for buying pens, papers, and printers. But with the

use of Internet the government will be able save these expenditures, which can be further used for other developments.

(iii)(a) *See answer to question 6(i)(a) June 2010. Read more on Chapter 8, Fundamentals of ICT for Cameroon Secondary Schools.*

(b) **Embedded systems**: An embedded system is a small computing device (microcontroller) that is built into a larger equipment often as a single chip and dedicated to a given task. They control many devices in use today such as digital watches, mobile phones, microwave ovens, washing machines, vehicles, photocopiers, and very large stationary installations like traffic lights, factory controllers or the systems controlling nuclear power plants.

(iv) *Network data transmissions often produce errors, such as toggled, missing or duplicated bits. As a result, the data received might not be identical to the data transmitted, which is obviously a bad thing. Because of these transmission errors, network protocols very often use error detection codes. Examples of error-detection codes include* ***parity checking, checksums*** *and* ***cyclic redundancy checks.*** *Read more on Chapter 9, Fundamentals of ICT for Cameroon Secondary Schools.*

- **Parity Checking**: Parity checking refers to the process of using a parity bit to check that data has been transmitted accurately. A parity bit is an extra bit transmitted with a data unit that will be used to check its integrity. There are two types of parity: odd parity and even parity.

- In *odd parity*, the parity bit is added such that the total number of bits at 1, in the data unit, is an odd number.
- In *even parity*, the parity bit is added so that the total number of 1s is an even number.

- **Checksum**: A checksum or ***hash sum*** is a small-size datum from a block of digital data for the purpose of detecting errors which may have been introduced during its transmission or storage. It is usually applied to an installation file after it is received from the download server. By themselves checksums are often used to verify data integrity, but should not be relied upon to also verify data authenticity.

9(i)(a) *See answer to question 9(v) June 2010*

(b) *See answer to question 4(ii)(b) June 2015*

(c) **Network repeater** devices typically integrate a signal amplifier into their circuitry. The repeater works as an intermediate between two message endpoints. It receives data from the original sender, process it through the amplifier, and then transmits the stronger signal forward to its eventual destination.

Signal amplification works in opposition electrically increasing the strength of a line signal by any of several technical methods. Different forms of amplification introduce more or less noise into the signal. On computer networks, amplification typically includes logic for noise reduction to ensure the underlying message data does not get corrupted in the process.

(ii)(a) Difference between Internet and Web

	Internet	**World Wide Web**
Name of the first version	ARPANET	NSFnet
Comprises	Network of Computers, copper wires, fibre-optic cables & wireless networks	Files, folders & documents stored in various computers
Governed by	Internet Protocol	Hyper Text Transfer Protocol

Dependency	This is the base, independent of the World Wide Web	It depends on Internet to work
Nature	Hardware	Software

(b) *Internet certainly has immensely impacted the life of everyone and it goes without saying that the youth makes the major proportion of the internet population. It stands true for every country and Cameroon is no exception.*

Positive impact of Internet -

- *Internet usage* - Internet has given meaning to everyone's life and our youth have not left a stone unturned to capitalize on it. In our daily life, right from the moment we open our eyes to the point we fall asleep, internet is always with us or in other words, we revolve in and around internet. It is the most powerful platform of the world.

- *Learning and Education* - Youth relies on internet to gather information. Learning and sharing of knowledge has become so easy only because of internet. There are thousands of website working towards the same mission and I do not want to start noting them down. One need not wait to purchase a book to start absorbing knowledge, material is now openly available and also, there is no shortage of assistance and mentorship through various means.

- *Social Networking* - Now, the second important facet is that of social networking. Life certainly has changed and evolved with social networking being in the epicenter of everything. People are far better connected than ever. Gone are those days when you can only be connected to a selected few. The youth believes in social networking and is very well connected. Websites like facebook, twitter etc have had a major impact. Reaching anyone has become so easy. *Who would have imagined that a tweet to railway and foreign minister would be answered and will be actioned upon too*?

- *Media Impact* - Internet is capable enough of making anyone a star and also, exposing the ones who deserve to grab our attention for all the wrong reasons. There are comedians, singers, writers etc. who just employs internet to achieve stardom and earn their living. Media is so very powerful. Youth no longer relies only on newspapers or a 8 PM show to know what is happening in the country. We believe in live feeds and is always connected through various sources again through internet.

- *E-commerce Boom* - E-commerce has changed the way we have done shopping and I believe the youth today is utilizing it the most. Shopping has become a matter of clicks and it is the internet that has helped us achieve it and not to forget, the huge economy that exists today only because of such a model.

Negative impact of Internet -

- *Internet Addiction Disorder* - The biggest negative impact has to be that it really makes one addictive. It really is hard to be a frequent n regular use without falling into its addiction. There is a disease too that the scientists believe it can give rise to and is termed as “Internet Addiction Disorder” and it can have its own adverse effects.

- *Sedentary Lifestyle* - It has also largely contributed to sedentary lifestyle. Who would want to do physical movement when almost everything is possible through couple of clicks. Be it banking, shopping, booking hospital, paying bills or even searching your dream home, its all so simple and fluidic in Internet. But this really has made the youth disease prone. We are prone to Obesity, Heart Ailments and even depression. Compare the youth with the previous generation and we all know for a fact that they are far happier and healthier than we are.

- *Cyber Crimes* - Also, how can I not mention about cyber-crimes. News that feature almost on a daily basis around money laundering and looting, exposing someone's private life through various means, stealing sensitive government information are really disturbing for every one of us and is the negative side of internet. Internet is open and there is no shortage of people who access internet only with malicious intent. Such is the magnitude of this problem, that Cyber Security now is a full-fledged career option.

(iii) 1 character = 1byte
1 novel = 2500 characters = 2500bytes
Amount of storage space for 2 million novels = 2 000 000 novels x 2500 Characters
= 5 000 000 000 Characters
= 5 000 000 000 Bytes
= 4882812.5 kilobyte, KB (divided by 1024bytes)
= 4768.4 megabyte, MB (divided by 1024bytes)
= 4.7 Gigabyte, GB (divided by 1024bytes)

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1(i)(a) *See answer to question 2(i)(a) June 2010*
(b) *See answer to question 6(i)(b) June 2012*
(c) **Office Automation**: Office automation (OA) refers to the collective hardware, software and processes that enable automation of the information processing and communication tasks in an organization. It involves using computers and software to digitize, store, process and communicate most routine tasks and processes in a standard office.
(d) *See answer to question 9(iv)(a) June 2015*

(ii)(a) *See answer to question 1(iii)(a) June 2011*

(b) *Applications of Robots*

- *Picking, Packing and Palletizing* – Most products are handled multiple times prior to final shipping. Robotic picking and packaging increases speed and accuracy along with lowering production costs.

- *Assembly* – Robots routinely assemble products, eliminating tedious and tiresome tasks. Robots increase output and reduce operational costs.

(c) *Disadvantages of robots*

- *The robots needs a supply of power*, The people can lose jobs in the factories, They need the maintenance to keep them running, It costs a lot of money to make or buy the robots , The software and the equipment that you need to use with the robot cost much money .

- *The robots can take the place of many humans in the factories*, So, the people have to find new jobs or be retrained, They can take the place of the humans in several situations , If the robots begin to replace the humans in every field , They will lead to unemployment .

- *The robots cost much money in the maintenance & repair*, The programs need to be updated to suit the changing requirements, the machines need to be made smarter , In case of the breakdown , the cost of repair may be very high , The procedures to restore lost code or data may be time-consuming & costly .

(iii)(a) Convert 580.25_{10} to binary

I will use the repeated division by 2. Since it's a fractional number, I will convert it in two parts; the whole part and the fractional part.
- *Whole part; 580*
580/2 = 290 R 0 (Least Significant bit)
290/2 = 145 R 0
145/2 = 72 R 1
72/2 = 36 R 0
36/2 = 18 R 0

18/2 = 9 R 0
9/2 = 4 R 1
4/2 = 2 R 0
2/2 = 1 R 0
1/2 = 0 R 1 (Most Significant Bit)
Putting the Remainders together from the MSB to LSB, 580 = 1001000100
- *Fractional Part: .25*
0.25 x 2 = 0.5 Carry 0
0.5 x 2 = 0 Carry 1
Hence, 0.25 = .01

Combining the fractional and whole part, $580.25_{10} = 1001000100.01_2$

(b) Evaluate 111_2 x 101_2

```
     111
  x  101
  ---------
    111
   000
  111
  --------
 100011
```

(c) Evaluate $1011011_2 + 11111_2$

```
1011011
+  11111
-----------
 1111010
```

2(i)(a) *See answer to question 1(ii)(a) June 2013*
(b) *See answer to question 1(ii)(b) June 2013.*
(ii)(a) *See answer to question 5(i) June 2010*

(b) *Examples of batch processing*

- Clearing of checks
- Transactions of credit cards
- Generation of bills
- Financial report generation
- Processing of images in bulk
- Processing of input and output in the operating system (os)

(iii)(a) *See answer to question 6(iii) June 2012.*
(b) *See answer to question 5(iii)(a) June 2015*
(iv) *See answer to question 4(ii)(b) June 2015*

3(i)(a) A **relational database** is one that contains multiple tables of data that relate to each other through special key fields. Relational databases are far more flexible (though harder to design and maintain) than what are known as **flat file databases**, which contain a single table of data.

(b) *Advantages of relational database over flat file database.*

Advantages	**Disadvantages**

- Data Integrity, You Only need to change the data in one of the tables, it will then update itself	- Complex, Relational databases can be very complex and without the necessary training can be very hard to break down.
- Data Redundancy, By having a relational databse it ensures that no attributes are repeated	- Expensive, Relational databases are mostly commercial and require the user to buy that piece of software or licenses for more than one machine
- Data Consistency, There is no chance of the same attribute being stored in a different format in a different file	
- Data Flexibility, When dealing with queries, it gets much easier creating deeper queries with a relational Databse - Greater Efficiency, as you only	
- have to input the data only once into a relational database it saves time and human resources	

(c) *See answer to question 3(i)(c) June 2014*
(ii)(a) **System testing**: is a level of software testing where a complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements.
(b) **Acceptance Testing**: s a level of software testing where a system is tested for acceptability. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery

(c) *See answer to question 8(i)(a) June 2011*

(iii)(a) *See answer to question 1(i)(b) June 2015*

(b) *See answer to question 9(ii)(b) June 2013*
(c) *See answer to question 9(ii)(c) June 2013*

4(i) (a) Switch, Router

(b) **Gateway**; A gateway is a device that connects two dissimilar computer networks using direct and systematic translation between protocols. A gateway translates outgoing network traffic to the protocol needed by the destination network. *The term gateway is also sometimes loosely used to describe any device that acts as the entry or exit point for a network.*

(c) *See answer to question 9(ii)(b) June 2010*

(ii)(a) *See answer to question 9(ii)(d) June 2013*
(b) *See answer to question 7(iv)(b) June 2014*
(c) *See answer to question 7(iv)(b) June 2014*
(iii)(a) Ways of protecting email accounts from virus attacks
- *Choose a strong password.* Longer is better; use a mix of letters, numbers, symbols, and punctuation marks.
- *Choose a strong security question.* Create the toughest question you can, or use false answers to the standard questions.

- *Use a secure Email service*: Make sure you're using a Secure Socket Layers (SSL)-enabled email client.
- *Encrypt your email messages* as well as your email server to keep messages unreadable by everyone except you and the recipient

(iv) *Advantages of wireless networks*

- The main advantage of a wireless network is that users can move around freely within the area of the network with their laptops, handheld devices etc and get an internet connection.

- Users are also able to share files and other resources with other devices that are connected to the network without having to be cabled to a port.

- Not having to lay lots of cables and put them through walls etc. can be a considerable advantage in terms of time and expense. It also makes it easier to add extra devices to the network, as no new cabling is needed.

- Wireless networks can sometimes handle a larger amount of users because they are not limited by a specific number of connection ports.

Disadvantages of wireless networks: See answer to question 4(ii)(b) June 2015

(iv) There are so many Internet services which the company can use; Instant messaging(IM), Internet Telephony, Interpersonal Computing (blogs, Social networking sites, wikis etc). *Read more on chapter 10, Fundamentals of ICT for Cameroon Secondary Schools.*

5(i)(a) *The logic of a program may not always be a linear sequence of statements to be executed in that order. The logic of a program may require execution of a statement based on a decision. It may repetitively execute a set of statements unless or until some condition is met. Control structures specify the statements to be executed and their order of execution.*

- **Sequential control**: A sequence control structure executes a set of instructions one after the other from the first to the last in the order they are given.

Syntax:
```
begin
    statement 1
    statement 2
    …
    statement n
    end
```

- **Selection Control:** A selection control structure (condition control structure) chooses the instruction or instructions to be executed based on the validity of a certain condition. *Examples are IF and CASE statements.*

Syntax:
```
if condition then
    statement 1
    else
    statement 2
```

- **Iteration(Repetition):** The repetition (iteration) control structure executes a statement or group of statements many times until a certain condition is reached. Repetition structures define the order of operations and the number of repetitions. They are also called loops. *Examples are, the WHILE, REPEAT and FOR loops.*

Syntax:
```
while condition do
    statement(s);
    end while
```

Algorithm	**Type of Control Structure**
A	Selection control
B	Sequential control
C	Iteration control

(ii) *See answer to question 5(i)(b) June 2014*

(iii)(a) "E-Government" refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government.

(b) *See answer to question 8(ii) June 2017*

6(i)(a) See answer to question 4(iv)(a) June 2016

(b) The memory chips available are ROM and RAM chips. *See answers to questions 4(iii)(a), 4(iv)(b) June 2016*

(c) A **random file** is a file in which records are stored in random order. In a random file, the value of the record key is mapped by a hash function to an address within the file where the record will be stored. The function transforms the value of a record key into an index that corresponds to a location in the file. This process is called hashing. Any record within this type of file can be accessed directly without reference to any other record.

On the other hand, a **sequential file** is a serial file in which records are stored in order by a record-key field. That is, the records are sorted according to a given field that identifies each record in the file, in a unique way. Sequential files are also accessed serially. However, a sequential file is particularly useful when a whole file of data has to be processed as it is faster and more efficient than other methods. Sequential files are ideal for master files and batch processing applications such as payroll and billing systems in which almost all records are processed in a single run of the
application.

(d) See answer to question 8(i)(b), (c) June 2011

(ii)(a) *Convert* 10100111_2 *to binary*

$10100111 = 1x2^7 + 0x2^6 + 1x2^5 + 0x2^4 + 0x2^3 + 1x2^2 + 1x2^1 + 1x2^0$

$= 128 + 0 + 32 + 0 + 0 + 4 + 2 + 1$

$= 167_{10}$

(b) *convert hexadecimal number A7 to binary*

Using the hexadecimal to binary conversion table, we can deduce that;

A = 1010 7 = 0111

$A7_{16} = 10100111_2$

(c) *Advantages of Increasing the memory of a computer system*

- *Increases the Number of Applications*: When you increase the RAM of a computer, you increase the maximum number of applications that can run simultaneously on the computer. The number of applications depend on both processing capacity and RAM, but by increasing the RAM there is a fair amount of increase in the number of applications the same CPU can run.
- *Improved PC Performance*: The overall performance of the PC increases with an increase in the RAM. By increasing the RAM, the PC gets faster in most of the cases. However, if there is an excess of RAM further increase will not make any effect.
- *Reduced CPU Load*: When there is high availability of RAM a lot of programs can run on the computer at the first time. A large number of programs can remain in standby inside the RAM while the CPU processes them one by one. Moreover, when switching between programs the PC does not needs to clean and copy data from the hard disc to the RAM. It is already there to process.
- Better Network Performance: Apart from the Network devices, the RAM and the processing capacity of the PC are responsible for seamless data transfer over the network. The data transmitted over the network is placed in the RAM when going out of the PC or coming into the computer from the network. Lack of RAM causes data transfer errors as there is no memory space to hold the data while transmissions.

7(i)(a) *See answer to question 9(vi) June 2010*. Examples include; Windows OS, Macintosh OS, Android OS, Linux, Ubuntu.

(b) *See answer to question 4(ii)(c) June 2016*

(c) *See answer to question 7(ii) June 2015, 9(ii) June 2015,*

(ii) *See answer to question 4(ii)(a) June 2010* (iii)(a) *Many people use the terms protection and security interchangeably, but while they share some similarities, they entail distinct processes and outcomes. In the digital world, protection and security have more complex meanings as data has unique attributes and challenges:*

Data protection refers to the mechanism of making copies of your data to restore in the event of a loss or corruption. Whereas, data security refers to the mechanism of keeping your data safe from unauthorized access and distribution.

Data security protects your data from unauthorized access that could result in comprised data, corruption, or deletion. Should your data security strategy fail, data protection facilitates the recovery of clean data copies.

(b) *See answer to question 3(iv) June 2013*

8(i)(a) *See answer to question 8(ii)(b) June 2011*
(b) *See answer to question 6(iv)(c) June 2015*
(c) *See answer to question 6(ii)(a) June 2017*
(ii)(a) Truth table of the logic circuit

X	Y	F
0	0	0
0	1	0
1	0	0
1	1	1

(b) X = 1, Y = 1
(iii) Theorem 1: $\overline{X + Y} = \bar{X} \cdot \bar{Y}$
Theorem 2: : $\overline{X \cdot Y} = \bar{X} + \bar{Y}$
(iv)(a) *See answer to question 6(ii)(a) June 2011*
(b) *See answer to question 6(ii)(b) June 2011*

9(i)(a) **Device driver**: A device driver is software that allows interaction between the operating system and a hardware device. It is an interface for communicating with the device through the specific computer bus that the hardware is connected to. Without an appropriate device driver the system cannot communicate with a device, rendering the device useless.

(b) **Utility software:** Utility software is used to enhance the operating system, or in some other way improve the usefulness of the system. They help analyze, configure, optimize and maintain the computer. Rather than providing user-oriented or output-oriented functionality, utility software focuses on how the computer infrastructure operates. Most major operating systems come with several preinstalled utilities.

(c) **Language translator:** A language translator is a computer program that translates program instructions from one programming language to another. There are three types of language translators: compilers, interpreters and assemblers.

(ii)(a) Program Evaluation Review Technique, *see answer to question 3(ii)(b) June 2015*

(b) Critical path analysis; *Read more on chapter 14.9, Fundamentals of ICT for Cameroon Secondary schools.*

Task	**Duration**	**Precedence**	**Earliest start time**	**Latest start time**	**Float time**
A	2	-	0	0	0
B	1	A	2	3	1
C	3	A	2	5	3
D	2	A	2	2	0
E	3	B	3	5	2
F	4	C	5	6	1
G	3	D	4	7	3
H	4	D	4	4	0
I	2	E,H	8	8	0

J	I	I,G,F	10	10	0

Activities with the same earliest and latest start times determine the critical path.

Critical path = A, D, H, I, J

(c) *Duration of the project* = A + D + H + I + J
= 2+2+4+2+1
= 11

(d) *Slack tasks and slack times*

Slack Tasks	Slack time
B	1
C	3
E	2
F	1
G	3

(ii)(a) *See answer to question 7(iv)(a) June 2014*

(b) *See answer to question 7(iv)(a) June 2014*

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1(i)(a) *See answer to question 5(ii)(b) GCEB June 2012*

(b) *See answer to question 8(iv) GCEB June 2015*

(c) SELECT product_name, unit_price
FROM invoice_table
WHERE unit_price <= 500
ORDER BY unit_price DESC, product_name;

(ii)(a) *See answer to question 4(ii) GCEB June 2011*

(b) *See answer to question 4(ii) GCEB June 2011*

(c) *See answer to question 4(ii) GCEB June 2011*

(iii)(a) S*pecial type of hardware used during video conferencing*

- *Microphone*: to get voice signals from user and feed into the communication system
- C*amera*: to capture the image of the user taking part in the meeting
- *Speaker*: to output the voice of the members communicating during the meeting
- *TV screen or Monitor*: to display the images of those taking part in the meeting

(b) *See answer to question 6(ii)(b) GCEB June 2010*

(c)- *Bandwidth*: when the number of users increase over a fixed bandwidth of a communication channel becomes congested, thus, slowing down communication due to several users using the communication channel at a time.

- *Distance*: the further the communicating devices are away from each other; the lesser the distance the signal can cover. Longer distances weaken the strength of the signal. Weak signals can't cover great distances, thus, slowing down the speed. In some cases, the signal is lost.

2(i)(a) *See answer to question 2(ii)(a) & (b) GCEB June 2012*

(b) *See answer to question 2(ii)(c) GCEB June 2012*

(c) *See answer to question 1(i)&(ii) GCEB June 2011*

(ii)(a) *See answer to question 1(ii)(b) GCEB June 2015*

(b) *See answer to question 3(ii) GCEB June 2014*

(c) *See answer to question 7(iii) GCEB June 2010*

(iii)(a) **Laser Printer**

Advantages

- Laser prints are generally very high and very accurate.
- For high volume printing laser printers are considerably cheaper to run.
- Printing is fast so they can handle large volumes.

Disadvantages

- Buying a laser printer can be expensive when compared to an inkjet.
- Color laser printers are significantly more expensive than a color inkjet.

(b) Inkjet Printer

Advantages

- Inkjet printers are considerably cheaper to buy.
- High end printers are capable of producing good quality images when used with special paper.
- Most models are relatively light weight and compact so they don't take up too much space on the desk.

Disadvantages

- Due to the cost of ink, running an inkjet printer over time is a more expensive than a laser printer.
- Prints emerge from the printer slightly wet and may need time to dry.
- Printing is slower and therefore inkjets aren't designed for high volume printing

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3(i)(a) *See answer to question 5(i)(a) GCEB June 2011; 5(iii) GCEB June 2014*

(b) *See answer to question 5(i)(b) GCEB June 2014*

(ii)(a) Network Interface Card (NIC)

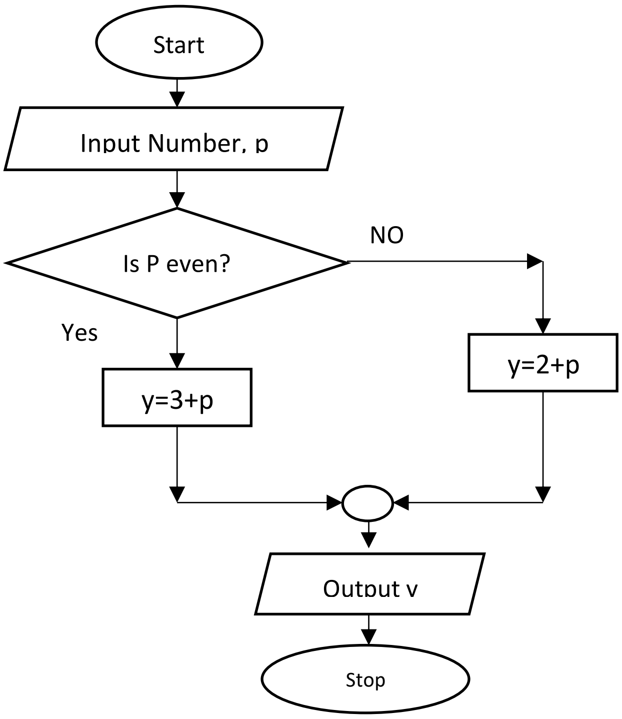
(b) *See answer to question 9(i)(b) GCEB June 2017*

(c) Star Topology, all devices will be connected to a central device. The central device will be able to monitor the all activities carried out on the network.

(d) Security measures for such a network are: Authentication and Encryption. *See answer to question 7(iii)(b) GCEB June 2018*

(iii)(a) This algorithm aims to output the value of a variable y, based on the value p will get. The criteria for selection is "if p is even".

(b) Flowchart



4(i)(a) *See answer to question 3(iii)(a) GCEB June 2018*

(b) *See answer to question 3(iii)(c) GCEB June 2018*

(ii)(a) *See answer to question 5(i)(b) GCEB June 2016*

(b) *See answer to question 1(iii)(a) GCEB June 2016*

(iii)(a) *See answer to question 6(ii) GCEB June 2013*

(b) *See answer to question 3(ii)(b) GCEB June 2010*

(c) *See answer to question 5(i)(d) GCEB June 2011*

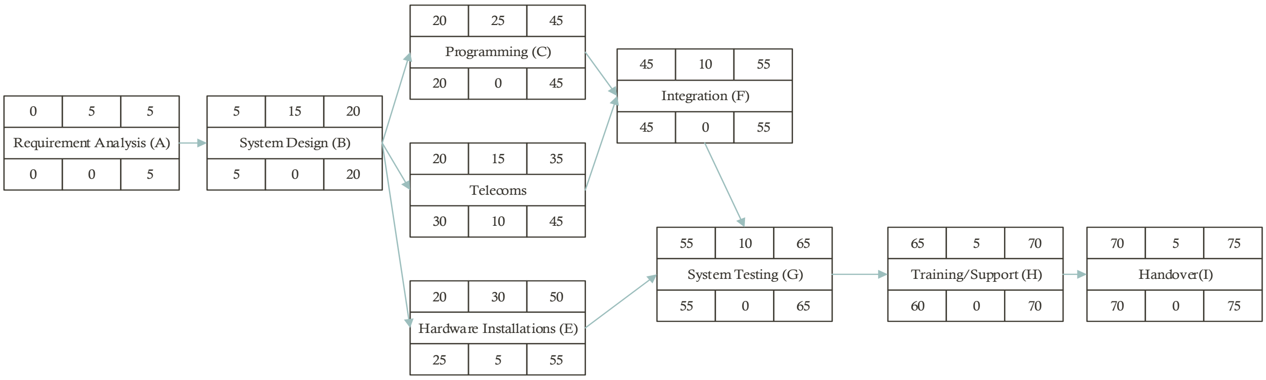
(d) *See answer to question 4(iii)(c) GCEB June 2011*

5(i)(a) Recursion: Some problems are recursive in nature. This means that the solution to such problems involves the repeated application of the solution to its own values until a certain condition is reached.

Algorithms for such problems are known as recursive algorithms. A recursive algorithm is an algorithm that calls (invokes) itself during its execution.

(b) Examples are; the factorial function and the sum function. *(Read more on Chapter 13.2 in Fundamentals of ICT for Cameroon Secondary Schools)*

(ii)(a) *See answer to question 6(ii)(c) GCEB June 2016.*
(c) There are three levels at which information can be used in an organization: strategic, tactical and operational levels.
a) **Strategic level,** information is needed by senior managers (executives) to help them with their business plans. Information at this level is used for making long term decisions.
b) **Tactical level**, information is needed by middle managers to help them monitor and control business activities. Tactical planning and decision-making takes place within the guidelines set by the strategic plan.
c) **Operation level**, employees with operational roles need information to help them carry out their duties. Results of operational work are passed upwards to let the tactical planners evaluate their plans.
(iii)(a) *PERT Chart*



(b) *Critical Path*: A, B, C, F, G, H, I
(c) *Slack Tasks*: Telecoms (D) [Slack Time = 10days], Hardware Installations(E) [Slack time=5days]
(d) *See answer to question 6(iii)(a) GCEB June 2016*

6(i)(a) *Cloud Computing and Dedicated Server*

A dedicated server is a physical server that is purchased or rented entirely for your own business needs. Dedicated servers are typically used by large businesses and organizations that require exceptionally high levels of data security, or organizations that have steady, high demands for server capacity.

Cloud Servers, instead of being hosted on physical hardware that’s solely used by you, they reside in a shared “virtualized” environment that’s managed by your cloud hosting provider. You benefit from the economies of scale of sharing hardware with other customers. And, you only pay for the exact amount of server space used.

(b) *Advantages of Cloud computing over Dedicated servers*

- Cloud servers are more cost- effective and does not require any upfront investment on purchasing and maintenance of infrastructure.
- Cloud can be configured to give your business the same features of a dedicated server in a shared environment.
- Cloud is more reliable as it runs on multiple servers and even if one component fails, services continue from the other servers. It is scalable on demand.
- Cloud is available via internet and allows the users to access the data from any location. Users pay for the services they use.

(ii)(a) *See answer to question 7(i)(b) GCEB June 2014*

(b) *See answer to question 6(iii) GCEB June 2010 (First point under disadvantages of using emails)*
(C) **Spyware**: Spyware is software that monitors a computer user's activity without their knowledge and reports it to a central location. The purpose of spyware ranges from purportedly benign (enforcing copyrights, displaying targeted advertisements) to very malicious (stealing passwords and credit card numbers).
(iii)(a) *Software categories and examples*

No	Software Type	Example
1	System Software	BIOS, Operating System
2	General Purpose	Word Processing, Spreadsheet, Desktop publishing
3	Utility	Recycler
4	Language Translator	Compiler, Interpreter, Assembler

(b) *See answer to question 9(ii)(a) GCEB June 2015*

7(i)(a) Resolution refers to the number of pixels (picture elements) in an image. The more the number of pixels in an image, the more detailed the image will be. *(Read More on Chapter 5.3 In Fundamentals of ICT for Cameroon Secondary Schools.)*

Cameras with high resolution produce images with high size. When viewed on the web or high-resolution TV/monitor, the device can display all intricate details found in the image. Which implies that high resolution cameras produce images with higher amount of details.

High resolution cameras provide additional functionality to crop the images produced. In this case, starting with images with higher number of pixels, you can reduce the number of pixels without sacrificing the quality of the image that much.

(b) Input devices are devices which enables us to send data to the computer. Automatic Input devices are those which require little or no human effort to capture and feed data to the computer. Examples are; Sensors, bar code reader, Magnetic Strip, Magnetic Ink Recognition (MICR), Optical Reader.

(ii)(a) *See answer to question 6(iii) GCEB June 2010*
(b) **Authenticity**: Sending mails via the post office requires several processes. During the process, the post office only delivers the mail to the designated person, and that is only possible after the receiver proves he is the rightful owner of the mail.

Security: Contrary to the internet, Post office don't suffer from malicious attacks or interception. So, the content of the mail is only delivered to the rightful owner.

(c) In order for Brandon to send and receive emails via his laptop, he needs to;

Internet Service Provider (ISP): This is the company which will enable him to have internet access. Without internet access, Brandon will not be able to send and receive emails over the internet and this is solely provided by ISPs.

MODEM: With this device, Brandon will be able to transfer information from his laptop through the internet to his destination. Similarly, this device will enable him receive emails transferred over the internet.

(iii)(a) *See answer to question 3(ii)(b) GCEB June 2016.*
(b) *See answer to question 8(i)(b) GCEB June 2011.*
(c) *See answer to question 7(i)(c) GCEB June 2017.*

8.(i)(a) Truth Table of the system, $F = \bar{A} \cdot \bar{B} + A \cdot B$

A	B	$\bar{A}$	$\bar{B}$	$\bar{A} \cdot \bar{B}$	$A \cdot B$	F
0	0	1	1	1	0	1

0	1	1	0	0	0	0
1	0	0	1	0	0	0
1	1	0	0	0	1	1

(b) $\overline{\bar{A}\cdot\bar{B}+A\cdot B} = \left(\overline{\bar{A}\cdot\bar{B}}\right)\cdot\left(\overline{A\cdot B}\right)$ De Morgan's law $\overline{A+B} = \bar{A}\cdot\bar{B}$

$= \left(\bar{\bar{A}}+\bar{\bar{B}}\right)\cdot\left(\bar{A}+\bar{B}\right)$ De Morgan's law $\overline{A\cdot B} = \bar{A}+\bar{B}$

$= (A+B)\cdot(\bar{A}+\bar{B})$

$= \bar{A}B + A\bar{B}$

(ii)(a) *See answer to question 3(i)(a) GCEB June 2014*

(b) For a database to be in First Normal Form (1NF), the following rules have to be met for each table in the database *(Read more on Chapter 12.3 in Fundamentals of ICT for Cameroon Secondary schools)*

- There are no columns with repeated or similar data
- Each data item cannot be broken down any further
- Each row is unique i.e. It has a primary key
- Each field has a unique name.

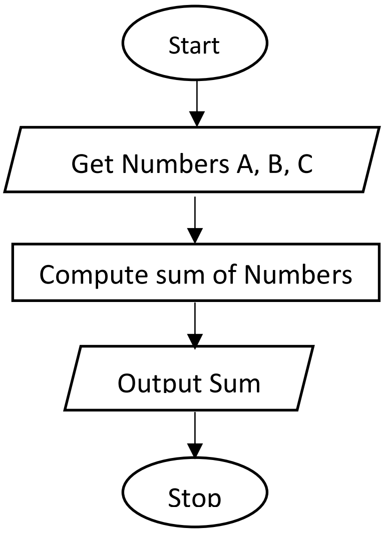
(c) *See answer to question 7(iv)(a) GCEB June 2010*

(iii)(a) *See answer to question 8(iii)(b) GCEB June 2013*

(b) *See answer to question 2(ii)(c) GCEB June 2014*

(c) Algorithm to calculate and display the sum of three numbers

Flow chart



Pseudo Code

```
Start
    Get Three numbers A, B, C
    Compute Sum of A, B, C
    Output Sum
Stop
```

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1(i)(a) *See answer to question 1(i)(a) June 2010*

(b) *See answer to question 8(i)(b) June 2015*

(c) *See answer to question 1(iii)(a) June 201*

(ii) *The factors that determine the reliability of an Information system could be rephrased as the characteristics of a good information system. Also, these factors could also be used in assessing the success of an IS.See answer to Question 6(i)(b) June 2017*

(iii) See answer to question 4(ii)(a) June 2015

(iv)(a) *In this text, we have come across the terms Simulation and Prototyping severally. A quick way to approach these questions will be to define both terms. Limiting your answer to the definition of both terminologies could be good but providing more information on the benefits of simulation and prototyping could impress your examiner, for your reference on Simulation, see answer to question 1(i)(b) June 2013 and question 5(iii) June 2016. Regarding Prototyping See answer to question 7(iii) June 2016 and question 3(ii)(c) June 2017.*

(b) *See answer to question 3(ii)(b) June 2017*

(c) See answer of question 3(ii)(c) June 2017

2(i)(a) *See answer to question 2(iii)(c) June2017*

(b) *Other modes of data transmission could be serial & parallel transmissions, broadband and baseband transmissions. For the definitions of these terminologies, see answer to question 2(ii)(a),(b) June 2017.*

(ii)(a) *See answer to question 2(ii)(b) June 2016*

(b) GIS: *see answer to Question 3(i)(b) June 2011*

DSS: *see Answer to Question 6(i)(a) June 2017*

(iii)(a) *See answer to Question 1(iii)(a) June 2015*

(b) Imperative & Declarative paradigms: *see answer to question 1(iii)(b) June 2015*

(c) *See answer to question 8(i)(a), (c) June 2010*

3(i)(a) See answer to question 8(i)(a) June 2011

(b) See answer to question 8(i)(b) June 2011

(ii)(a) the scripting language is called HTML (Hypertext Markup Language). (*See Answer to question 8(i)(b) June 2016 for the definition of HTML*.)

(b) The **action** attribute specifies where to send the form-data when a form is submitted.

The **Method** attribute defines how the information will be sent. *For more details on the topic, read chapter 10, section 10.11.8 in Fundamentals of ICT for Cameroon Secondary Schools.*

(c) either "post" or "get" can be used.

Note: An HTML form is a set of one or more input controls and a submit button. The form The form controls are surrounded by a <form> tag which has two important attributes: action and method. Also, forms themselves are not visible but contain visible elements such as list -boxes and dropdown lists.

(iii)(a) - *Promote patient centered healthcare and Improves quality of care*: ICT can help improve patient safety through the direct access to the medical case story, checking the treatments online, keeping track of the patients' progress and anticipating possible medical errors. In general terms, they are regarded as generally positive tools among professionals and users. Since they provide a way to increase the patient safety,

- *Saves Cost*: Helps reduce costs by reducing the time required to process data and manage paperwork in hospitals.
- *Educate Health Professionals and Patients*: ICT have been defined as technology with a high transformative potential, since it introduces new ways to carry out medicine and develop health care. They renew primary health care since they contribute to a personalized following of chronic diseases; they improve the access to health care in rural populations; and they contribute to the optimizing data measuring and supervision.

(b) – Technical issues: There is inadequate planning for implementation and use of Health Information System.

- *Organizational issues* i.e. inadequate facilities for fast and easy access to the Internet
- *Low awareness:* There exist inadequate awareness of healthcare providers about the benefits of Health Information System.
- *Legal and ethical issues*: There is little knowledge and concern about the security and confidentiality of Health Information System.

4(i)(a) *See answer to question 6(ii) June 2012*

(b) *See answer to question 6(ii) June 2012*

(c)- **Round-robin** algorithm distributes time equitably among all ready processes by establishing a particular time slice (or time quantum), during which each process executes. At the end of the quantum, the process is pre-empted. It returns to the ready state to allow another process its turn.

- **First come, first served** algorithm moves processes to the CPU in the order in which they arrive in the ready queue. It is non-pre-emptive. As such, when a process has the CPU it runs to completion before giving up the CPU. (*For more details on the topic, read chapter 4, section 4.5.3 in Fundamentals of ICT for Cameroon Secondary Schools).*

(ii)(a) *See answer to question 5(iv) June 2013*
(b) *See answer to question 5(iii) June 2014*
(c) *See answer to question 5(i)(a) June 2014*
(iii) **Interrupt**: (*see answer to question 7(iii) 2015)* whereas **polling** is the continuous checking of other programs or devices by one program or device to see what state they are in, usually to see whether they are still connected or want to communicate.
(iv)(a) Alternatively known as "file format*". See answer to question 4(i)(a) June 2015 for the definition of file formats.*
(b)

FILE TYPE	**FILE EXTENSION**
Bitmapped graphics	.JPEG
Document	.PDF
Video	.MP4

5. (i) **P** = OR gate; **R** = NAND gate
(ii) **C** = A + B (A OR B)
D = $A \cdot B$ (A AND B)
E = $\overline{C \cdot D}$ = $\overline{(A + B) \cdot (A \cdot B)}$
(iii) Truth table for Figure 5

A	**B**	$C = A + B$	$D = A \cdot B$	$E = \overline{C \cdot D}$
0	0	0	0	1
0	1	1	0	1
1	0	1	0	1
1	1	1	1	0

(iv)(a) *See answer to question 8(ii)(a) June 2011*
(b) The methodologies for controlling projects include the waterfall methodology, the Program Evaluation Review Technique (PERT) etc.
- *waterfall methodology*: The waterfall model is the most common and classic of SDLC models. It illustrates the software development process in a linear sequential flow; hence it is also referred to as a linear-sequential life cycle model.
- PERT: *See answer to question 3(ii)(b) June 2015*

(c) *See answer to question 3(ii)(a) June 2015*

6.(a) **Computer Assisted Learning** (CAL) is the use of computer technologies (hardware, software and network tools) to enhance the learning experience. Today, CAL means learning on mobile phones, virtual reality and augmented reality in addition to desktop and laptop computer interaction.
(b) - W*eb-enhanced courses*, which combine the traditional classroom delivery style with an school's learning management system (LMS). The LMS stores course materials that support specific curriculum objectives and all lectures are delivered in a physical classroom.
- *Online courses*. They are administered synchronously or asynchronously through the school's LMS, and on-campus meetings are not required.

(c) **Advantage**:
- CAL is individualized, that is each student is free to work at his own place, totally unaffected by the performance of any other students.
- CAL forces active participation on the part of the student, which contrasts with the more passive role in reading a book or attending a lecture.
- CAL utilizes a reporting system that provides the student with a clear picture of his progress. Thus students can identify the subject areas in which they have improved and in which they need improvement.

Disadvantage:

- A CAL package may be regarded simply as a novelty, rather than an integral part of the educational process. It may threaten the objectives of the package.
- Though simulation permits execution of chemical and biological experiments, hands-on experience is missing. Moreover, CAL packages cannot develop manual skills such as handling an apparatus, working with a machine etc
- Content covered by a certain CAL package may become outdated. A very high cost is involved in the development of these packages. If the course is outdated, the resources involved in its development will be a waste.

(ii)(a) A **relationship** type is a named association between entities in a database. For instance, a person (entity) owns (relationship) a house (entity), a teacher (entity) teaches (relationship) a subject (entity). Normally, individual entities have individual relationships of the type between them but in an E-R diagram, this is generalized to entity sets and relationship types.

(b) An **attribute** is a fact about an entity or a property that describes an entity. For example, a person's name, date of birth or gender, a vehicle's model, color or brand. Attributes store the actual data we want to keep about each entity within an entity set.

(c) Data **entry** is the inputting of data or information into a computer using input devices, such as a keyboard, scanner, disk, and voice. Data entry can be performed by an individual typing at a keyboard or by a machine entering data electronically.

(d) *See answer to question 3(i)(c) June 2014*

(iii)(a) Database **normalization** is the process of organizing the fields and tables of a relational database to minimize redundancy and dependency. Normalization usually involves dividing large tables into smaller and less redundant tables and defining relationships between them.

(b) **First Normal Form**

For a database to be in first normal form (1NF), the following rules have to be met for each
table in the database

- There are no columns with repeated or similar data
- Each data item cannot be broken down any further.
- Each row is unique i.e. it has a primary key
- Each field has a unique name

'Atomic' is the word used to describe a data item that cannot be broken down any further e,g, First name (Owen), Telephone number, Insurance number, School name etc.

(iv)(a) *See answer to question 6(iv)(a) June 2016*

(b) Difference between multitasking and multiprogramming

Multiprogramming	**Multitasking**
Multiple processes run concurrently at the same time on a single processor.	More than one task is executed at a single time utilizing multiple CPUs
based on the concept of context switching	Based on the concept of time sharing
Multiple programs reside in the main memory simultaneously to improve CPU utilization so that CPU doesn't sit idle for long time	It enables execution of multiple tasks and processes at the same time to increase CPU performance
Utilizes single CPU for execution of processes	Utilizes multiple CPUs for task allocation
Takes more time to execute the processes	Takes less time to execute the tasks or processes

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7(i)(a) *See answer to question 3(ii)(a) June 2010*

(b) *See answer to question 3(ii)(a) June 2010*

(c) *See answer to question 1(i)(a) June 2014.*

(ii)(a) Data integrity (*See question 3(iii) June 2013*) while data verification (*See answer to question 1(i)(a) June 2013*).

(b) *See answer to question 1(iii)(b) June 2014*

(iii)(a) *See answer to question 3(ii)(a) June 2016*

(b) *See answer to question 2(ii)(b) June 2014* (iv)(a) 256_8 to base 2

Using the octal binary conversion table

2 5 6

010 101 110

256_8 = $\mathbf{010101110_2}$

(b) 11011.11_2 to base 10

1 1 0 1 1 .1 1_2

$= (1*2^4) + (1*2^3) + (0*2^2) + (1*2^1) + (1*2^0) + (1*2^{-1}) + (1*2^{-2})$

= $\mathbf{27.75_{10}}$

8(i)(a) *See answer to question 5(iii)(a) June 2018*

(b) *See answer to question 9(i)(b) June 2016*

(c) *See answer to question 7(ii) June 2017*

(ii)(a) *See answer to question 9(ii)(a) June 2016*

(b) *See answer to question 9(ii)(b) June 2016*

(iii)(a) An **IP address (Internet Protocol)** is a unique address that identifies a device on the internet or a local network. It is the set of rules governing the format of data sent via the internet or local network.

(b) *Generally effective communication over the internet uses up at least one protocol. Some protocols may have different targets and roles but they all share some similar traits. We will use the exam of sending a mail to try highlight how protocols work.*

First, there is a protocol for mail. This defines a set of commands which one machine sends to another, e.g., commands to specify who the sender of the message is, who it is being sent to, and then the text of the message. However, this protocol assumes that there is a way to communicate reliably between the two computers. Mail, like other application protocols, simply defines a set of commands and messages to be sent. It is designed to be used together with TCP and IP. TCP is responsible for making sure that the commands get through to the other end.

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1(i)(a) Programmable ROM (PROM) is ROM that can be programmed once but not reprogrammed.

- Erasable Programmable ROM (EPROM) is ROM that can be erased by strong ultraviolet light and new data burnt into it. To do this the chip has to be removed from the machine and put back after the changes have been made.
- Random access memory (RAM) also called “main memory” is the temporary storage space into which a computer loads programs and user data when it is running. It is the computer’s working space. It is read/write meaning that data can be read from and written onto it.

(b)

Bibliography

[1] CGCEB Past papers I (June 2013-2021)

[2] CGCEB Past Papers II (June 2010-2021)

[3] Nkweauseh & Nkameni (2016), *Fundamentals of ICT for Cameroon Secondary Schools*, Quality prints, Bamenda, Cameroon.